

METEOROLOGICAL SERVICE, DOMINION OF CANADA.

Monthly Weather Review.

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No. 1

INTRODUCTION.

In compiling the present review, the data received at the various stations during the month have been used for the purpose of ascertaining the general character of the weather, and for the purpose of comparing the results with the corresponding months of the preceding years. The data were obtained from the reports of the various stations, and from the reports of the various signal agents. The data were obtained from the reports of the various stations, and from the reports of the various signal agents. The data were obtained from the reports of the various stations, and from the reports of the various signal agents.

REMARKS ON THE WEATHER.

The weather of January in Ontario was, on the whole, of a moderate character, and was generally unimportant, except in some cases where the weather was very cold, and the snow was somewhat above the average.

In British Columbia the weather was, on the whole, of a moderate character, and was generally unimportant, except in some cases where the weather was very cold, and the snow was somewhat above the average. On or about the 10th the weather changed, and the temperature fell below zero, and the snow was somewhat above the average. On the coast the weather was, on the whole, of a moderate character, and was generally unimportant, except in some cases where the weather was very cold, and the snow was somewhat above the average.

The weather in the Northwest Territories was, on the whole, of a moderate character, and was generally unimportant, except in some cases where the weather was very cold, and the snow was somewhat above the average. On or about the 10th the weather changed, and the temperature fell below zero, and the snow was somewhat above the average. On the coast the weather was, on the whole, of a moderate character, and was generally unimportant, except in some cases where the weather was very cold, and the snow was somewhat above the average.

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In the Province of Quebec the weather was, on the whole, of a moderate character, and was generally unimportant, except in some cases where the weather was very cold, and the snow was somewhat above the average. On or about the 10th the weather changed, and the temperature fell below zero, and the snow was somewhat above the average. On the coast the weather was, on the whole, of a moderate character, and was generally unimportant, except in some cases where the weather was very cold, and the snow was somewhat above the average.

The weather in New Brunswick was, on the whole, of a moderate character, and was generally unimportant, except in some cases where the weather was very cold, and the snow was somewhat above the average. On or about the 10th the weather changed, and the temperature fell below zero, and the snow was somewhat above the average. On the coast the weather was, on the whole, of a moderate character, and was generally unimportant, except in some cases where the weather was very cold, and the snow was somewhat above the average.

On the Atlantic side of Nova Scotia the weather was unusually mild, and there was much rain, whilst elsewhere it did not deviate much from normal. The coldest periods, when temperatures at or near zero were recorded, occurred in most districts between the 1st and 3rd, from the 10th to 13th, and 26th to 31st. -11.5 being reported from Truro, and -10.9 from Pictou on the 2nd. Sleighing was nowhere very good, and in districts contiguous to the Atlantic the ground was bare after the 3rd.

In Prince Edward Island the weather was generally fine and enjoyable, and the lowest temperature recorded was -10.0 at Summerside and Hamilton on the 2nd, while 12.9 was reported from each of these places a few days later. At Charlottetown the maximum temperature was 43.4, and the minimum -7.9, the former occurring on the 7th and the latter both on the 10th and 11th. At the last mentioned station the depth of snow on the ground on the 31st was four inches, nevertheless there was fair sleighing in most districts.

F. F. PAYNE.

ATMOSPHERIC PRESSURE.

The mean atmospheric pressure was from average to .040 inches above mean the Lower Lake Region to our Atlantic Coast, and below average in all the remaining portion of Canada, the deficiency being as much as .100 inches to .130 inches over Manitoba, the Territories, and the larger portion of British Columbia.

HIGH AREAS.

There was a large amount of high pressure during the month. The eight areas traced were all of fairly large dimensions, whilst there were others of less importance not traced, whose paths it was not possible to accurately determine. No. I. This area was a continuance of No. IX, on the December chart. On the morning of the 1st it had two well-defined foci; these, however, united during the day, and on the 2nd the area moved off the Middle Atlantic Coast and gradually passed out to sea. No. II, first became well defined in the North Pacific States between the 14th and 5th. It travelled with great rapidity to the Lower Lake Region, and on the 6th it continued its rapid movement over the St. Lawrence Valley to the Gulf. It was of moderate energy throughout. No. III. This was an area of moderate energy which travelled between the 5th and 8th from the North Pacific States south east to Tennessee, and thence off the Middle Atlantic Coast. No. IV. This area was well pronounced to the northward of Manitoba on the 8th. It quickly proved itself to be of great importance, and between the 9th and 13th, as it travelled south east to the Ottawa Valley and thence off the New England Coast, it brought the minimum temperature of the month at most places from Manitoba to our Atlantic Coast. No. V. This was a fairly important area which developed over the North west Territories between the 15th and 19th, and afterwards travelled to the Lower Lakes, where it was central during the night of the 18th. It afterwards passed to the southward and dispersed. It was not accompanied by any very low temperatures, except in a few places, but it was attended by sharp freezing weather generally. No. VI. This area moved into the North-west Territories on the 25th, attended by decidedly cold weather, and on the 26th the temperature was from 34 to 36 below zero in the Territories and Manitoba. On the 27th, with diminishing energy, the area passed southward to the Central States and on the 28th off the New England Coast. It brought hard freezing weather from the Lakes to the Atlantic, and a minimum of from 20 to 26 below zero in northern localities. Nos. VII. and VIII. Both of these areas first appeared in the North-west Territories, one on the 27th, the other on the 29th. They pursued very much the same course passing southerly to the Lower Mississippi Valley, and then diminishing in energy. They were each attended by very cold weather, and this cold weather was very generally experienced in all portions of Canada.

LOW AREAS.

Fifteen low areas have been traced during the month, of which five appeared at first in the extreme south-west States or Mexico and moved east or north-eastward, two came from the middle States and moved north-eastward, five from the North West Territories with a south-east or north-east movement, one started north of Lake Superior with at first a south-east and then a north-east course, one passed north-east up the Gulf Stream, one came from the Pacific near latitude 47 and travelled in an erratic course across the continent, and one which has not been tracked hovered for some days off the Vancouver coast. The mean rate of travel was 12.4 miles per hour.

No. 1 was centred near Cape Hatteras on the night of December 31st, as a slight depression, and during the 1st January developed considerable energy as it passed to Newfoundland. It gave a moderate to fresh gale in the Bay of Fundy and off the Nova Scotian Coast and a general fall of snow throughout the Maritime Provinces. No. 2 was off the Vancouver Coast at the end of December and hovered there until the 3rd of

January when it dispersed, having caused strong gales and heavy falls of snow in British Columbia. No. 3, started over Colorado on the morning of the 3rd, whence it moved north-eastward with increasing energy across the Lake Region, where it caused a fresh gale and a general fall of rain. From the Lake Region it passed to Labrador, causing a moderate to fresh gale throughout eastern Canada, on the 5th. No. 4 appeared over Mexico on the morning of the 5th, and with increasing energy moved rapidly north-eastward. It caused a moderate snowfall over the greater part of the Lake Region and Quebec, and in the Maritime Provinces snow or rain with moderate to fresh gales. No. 5 was an area of small dimensions, but in conjunction with an important anti-cyclone, which followed it from the North-west, gave strong winds or moderate gales with light local snowfalls from the Lakes to the Atlantic. No. 6 was quite unimportant and first appeared over Mexico on the 9th. It moved to the Lower Mississippi Valley and dispersed. No. 7 was off the Vancouver Coast on the morning of the 10th, and thence moved eastward to the north of Lake Superior. It was of wide extent at the Pacific Coast where it gave high winds and rain. It brought milder weather to the North-west and a light fall of snow or rain, but had on reaching there diminished considerably in energy. From the north of Lake Superior it moved south-eastward to the New England Coast and for a time two distinct foci were formed, but these coalesced on reaching the Atlantic Coast. It re-developed as it then passed north-eastward across Nova Scotia and gave a heavy fall of rain or snow in the Maritime Provinces. No. 8 was first noticed over Texas on the morning of the 13th, and from that state moved rapidly north-eastward to the Lower Lake Region, where on the 14th it caused strong winds and gales with rain and sleet, and on the 15th it moved over the Maritime Provinces where strong east winds and rain were followed by a north-east gale. No. 9 appeared over the extreme North-west and moved to the north of Lake Superior, where it apparently dispersed after having caused high winds and light local snowfalls in Assiniboia and Manitoba. No. 10 was also first noticed over the extreme North-west on the 18th, whence it passed slowly south-eastward to the St. Lawrence Valley. It gave strong winds and gales in Assiniboia and Manitoba, and subsequently caused strong winds and gales with local snowfalls in the Lake Region, and fresh winds with local snow or rain in Quebec and the Maritime Provinces. Nos. 11 and 12. Late on the 22nd a trough of low pressure extended from north-western Ontario southward to Texas. By the following evening there were two distinct foci, one north of Lake Huron and the other over the Lower Mississippi Valley, the former proved unimportant, and as it moved eastward on the 24th was accompanied by but light local snowfalls, while the other passing north-eastward with increasing energy caused gales with heavy precipitation on the Middle Atlantic Coast, and subsequently early on the 25th a heavy blow with rain and sleet in the Maritime Provinces. No. 13 apparently came from the northern portion of British Columbia and was first seen on the chart on the 23rd. From thence it moved south-eastward to the Lakes giving strong winds or gales and light local snowfalls throughout the North-west. On reaching the Lake Region it developed considerably, giving fresh to strong gales and local snowfalls. From the Lakes it took a north-easterly course passing over northern Newfoundland and Labrador on the 27th, and causing fresh to strong gales throughout eastern Canada with light snow in Quebec, and rain in the Maritime Provinces. No. 14, was apparently subsidiary to No. 13 and was small and unimportant until it reached the Gulf of St. Lawrence where it caused strong winds. It was first shown on the chart as being centred over Manitoba on the morning of the 27th, and moved south-eastward to the Upper St. Lawrence Valley and thence north-east and east passing to Labrador and Newfoundland on the 29th. No. 15 appeared on the 29th to the north of Lake Superior, but was a shallow depression of little importance. It passed to the north of the Ottawa and St. Lawrence Valleys and crossed Newfoundland on the 30th. No. 16 was over New Mexico on the 30th and passed eastward and off the Atlantic Coast. It was of moderate intensity.

WINDS.

In British Columbia during the month the winds increased to gales on eight days, on three of which the force of a fresh gale was reached and one, the 31st, that of a heavy gale. In the North-west Territories the winds were fresh or strong during the greater part of the month, and the force of a gale was reached on a few occasions; the most prevalent directions being westerly and southerly. In Manitoba the force of a gale was reached on several occasions and the winds, as in the North-west Territories, were fresh or strong during the greater part of the month, whilst westerly was the most prevalent direction. In the Lake Superior district one gale occurred and fresh to strong winds were frequent. In the Lower Lake Region there were nine gales, three of which were strong and six moderate, whilst the winds most in evidence were from between S. & W. Seven gales occurred in Quebec, of which four attained the force of a strong gale and westerly were the most prevalent winds. In the Maritime Provinces the winds, which were mostly from the west, attained the force of a gale on seven occasions, four of which were strong gales. A brief description of each storm in eastern Canada where navigation remained open is as follows: January 1st. A moderate gale in Maritime Provinces which locally increased to a fresh gale. January 4th, the Maritime Provinces were warned for a strong gale on the 5th and a fresh to strong gale occurred. Grand Manan reported a velocity of 18 miles per hour from the S. W. On the 6th, at 10 a.m., warnings for a strong gale was sent to eastern Canada and later in the

day a fresh to heavy gale set in, Grand Manan reporting 48 miles per hour from the east. Maritime ports were warned on the morning of the 14th for a moderate gale and later in the day and on the 15th moderate gales prevailed. On the 16th also a warning for moderate gale was sent, and next day a moderate to strong easterly gale occurred. A warning was sent to eastern stations on the 21st, at 2 p.m. for a strong easterly gale, and that night a strong gale set in; the agent at Lisianski reported tremendous seas, whilst at Halifax the wind reached a velocity of 42 miles per hour. A moderate to heavy gale occurred on the 26th and 27th, which was warned on the morning of the 26th.

BRIGHT SUNSHINE.

The amount of bright sunshine was below average to a small extent over Vancouver Island and British Columbia, and above average in all the large remaining portion of the Dominion, the greatest general amount above average occurring over the Province of Ontario.

TEMPERATURE.

Temperature conditions were in several respects rather remarkable, especially so in the Lake Region, where the change from minus to plus, or *vice versa*, was very sharply defined. This was very noticeable between Welland and Stratford, the former place being 3° above and the latter 2° below average. From British Columbia to Keewatin Territory temperature was *everywhere* above average, the excess being as much as 6° in Northern Alberta. From the Eastern portion of Ontario to our Atlantic Coast, even in Cape Breton, it was also in all localities above average, but at the majority of places the amount did not exceed 1°.

The Highest and Lowest Temperatures in each Province during January, 1899, were:

British Columbia,	69° 0 on 19th at Ladner,	42° 5 on 5th at Midway,
North-west Territories,	50° 0 on 20th at Macleod,	42° 0 on 1st at Duck Lake,
		57° 5 on 8th at Oonikup,
Manitoba,	36° 0 on 18th at Portage la Prairie,	47° 5 on 7th at Emerson,
	36° 0 on 21st at Emerson,	
Ontario,	58° 0 on 16th at St. George,	60° 0 on 9th at Missanabie,
	58° 0 on 16th at St. Ann's,	
Quebec,	51° 0 on 5th at Richmond,	42° 0 on 2nd at Chicomini,
New Brunswick,	42° 6 on 5th at St. Stephen,	26° 6 on 30th at Sussex,
Nova Scotia,	53° 0 on 7th at Woodville,	41° 5 on 2nd at Truro and Parrsboro,
P. E. Island,	44° 0 on 5th at Charlottetown,	40° 0 on 2nd at Summerside and Hamilton.

PRECIPITATION.

In the Lake Superior District, the Ottawa and St. Lawrence Valleys, and also over the greater portion of the Maritime Provinces, precipitation was below average, except very locally, where it was somewhat exceeded. The greatest general deficiency occurred in the Province of Quebec, Quebec itself being 1.7 inches below average, and Father Point 2.0 inches below. In the North-west Territory and Manitoba it was on the other hand as a rule above average, and only very locally below, the greatest amounts above average being 0.9 inch at Winnipeg, and 1.0 inch at Prince Albert. In British Columbia, Victoria was 0.7 inch below average, but Lower Mainland stations report a heavy precipitation. The most noticeable feature of the January precipitation was the phenomenally heavy snowfall in the Georgian Bay Region, where at the close of the month the amount of snow reported on the ground was: at Parry Sound, 56 inches; Spruceside, 48 inches; Beatrice, 37 inches; Haliburton, 24 inches; Collingwood, 36 inches; Owen Sound, 27 inches; Bogoria, 24 inches. On the other hand, in the Lower Lake Region, there was little or no snow on the ground at the end of the month.

PRESSURE, TEMPERATURE, WIND AND PRECIPITATION AT STATIONS IN THE DOMINION OF CANADA, JANUARY, 1899.

a Barometer not reduced to Sea Level * Stations not furnished with Registering Thermometers.

STATION.	Latitude N.	Longitude W.	TEMPERATURE.			PRECIPITATION.			WIND.			DIRECTION OF WIND FROM			VELOCITY OF WIND.			PRECIPITATION.			No. of Days.			
			Level, above Sea.	Pressure.		Years of record.	Temperature.		Mean relative humidity.	No. of days completely clouded.	DIRECTION OF WIND FROM			VELOCITY OF WIND.			PRECIPITATION.			No. of Days.				
				Mean reduced.	Range.		Mean daily range.	Lowest.			N. E. S. W. N. W. S. E. N. E. S. W. N. W. S. E.	Mean miles per hour.	Highest days velocity.	Rate and direction from.										
BRITISH COLUMBIA.																								
Vancouver	49 13 33	123 01	0	30.00	29.82 to 30.17	14	4.0	2.0	76	1					1.5	17	10	10	0.0	0	0	0	0	
Victoria	48 21 13	123 34	0	30.00	29.82 to 30.17	14	4.0	2.0	76	1					1.5	17	10	10	0.0	0	0	0	0	
Abbotsford	49 03 33	122 33	0	30.00	29.82 to 30.17	14	4.0	2.0	76	1					1.5	17	10	10	0.0	0	0	0	0	
Fort Simpson	58 33 33	113 33	0	30.00	29.82 to 30.17	14	4.0	2.0	76	1					1.5	17	10	10	0.0	0	0	0	0	
Fort St. John	58 33 33	113 33	0	30.00	29.82 to 30.17	14	4.0	2.0	76	1					1.5	17	10	10	0.0	0	0	0	0	
Revelstoke	49 13 33	118 33	0	30.00	29.82 to 30.17	14	4.0	2.0	76	1					1.5	17	10	10	0.0	0	0	0	0	
Kamloops	49 13 33	120 33	0	30.00	29.82 to 30.17	14	4.0	2.0	76	1					1.5	17	10	10	0.0	0	0	0	0	
Polar Bear	60 13 33	100 33	0	30.00	29.82 to 30.17	14	4.0	2.0	76	1					1.5	17	10	10	0.0	0	0	0	0	
Missou Valley	49 13 33	115 33	0	30.00	29.82 to 30.17	14	4.0	2.0	76	1					1.5	17	10	10	0.0	0	0	0	0	
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Revelstoke	49 13 33	118 33	0	30.00	29.82 to 30.17	14	4.0	2.0	76	1					1.5	17	10	10	0.0	0	0	0	0	
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Revelstoke	49 13 33	118 33	0	30.00	29.82 to 30.17	14	4.0	2.0	76	1					1.5	17	10	10	0.0	0	0	0	0	
Revelstoke	49 13 33	118 33	0	30.00	29.82 to 30.17	14	4.0	2.0	76	1					1.5	17	10	10	0.0	0	0	0	0	
Revelstoke	49 13 33	118 33	0	30.00	29.82 to 30.17	14	4.0	2.0	76	1					1.5	17	10	10	0.0	0	0	0	0	
Revelstoke	49 13 33	118 33	0	30.00	29.82 to 30.17	14	4.0	2.0	76	1					1.5	17	10	10	0.0	0	0	0	0	
Revelstoke	49 13 33	118 33	0	30.00	29.82 to 30.17	14	4.0	2.0	76	1					1.5	17	10	10	0.0	0	0	0	0	
Revelstoke	49 13 33	118 33	0	30.00	29.82 to 30.17	14	4.0	2.0	76	1					1.5	17	10	10	0.0	0	0	0	0	
Revelstoke	49 13 33	118 33	0	30.00	29.82 to 30.17	14																		

[illegible]

PRECIPITATION AT STATIONS REPORTING RAIN, SNOW AND WEATHER, DURING
JANUARY, 1899.

STATIONS.	RAIN.				SNOW.				Remarks.
	Amount in inches.	No. of Days of Trace or Over.	No. of Fair Days.	Heaviest Fall in Month.	Date.	Amount in inches.	No. of Days.	Heaviest Fall in Month.	
BRITISH COLUMBIA.									
Beaver Creek	7.88	11	16	1.97	19	14.3	7	8.9	1
Langley	9.91	20	11	1.23	19				
Goldstream Lake	6.40	9	15	1.20	19	4.7	7	20.0	1
Nanaimo	6.43	13	15	1.87	9	11.0	3	6.0	7
Royal Oak	5.65	13	17	0.55	9	9.3	1	0.3	9
Salt Spring Island	5.63	15	13	1.35	13	1.5	3	6.5	9
NORTH-WEST TERRITORIES.									
West Beaver Hills	0.10	1	17	0.10	24	9.8	11	3.0	29
MANTOBA.									
Oak Bank	0	0	22			10.0	7	3.0	13
Nongway			24			7.8	7	2.0	1
Hartney			26			7.0	5	2.5	14
Pilot Mound			26	6	14	5.0	4	2.0	9
Point in a Crossing			20				10		
Rapid City			24			5.0	7	2.0	24
Belmont			25				6		
Morden			19			7.8	12	4.0	25
Shed Lake			21			8.0	10	5.0	5
Gretna	6		26			28.0	5	26	29 (21)
Turtle Mountain			28			7.0	3	3.0	23
ONTARIO.									
Lansdowne	1.63	3	24	0.70	14	1.5	4	2.0	7
Sparrow Lake	2.00	1	18	2.00	4	21.8	12	7	17
Princeton	1.42	4	22	0.80	4	7.0	5	2.0	7
Warton	1.59	5	15	0.72	4	26.0	10	7.0	1
Windsor	2.18	5	20	1.20	4	0.0	5	4.0	29
Jornay	1.90	2	26	1.15	4	0.0	7	1.0	29
Cherry Valley	1.26	3	26	0.54	4	6.0	2	4.0	30
McGauge	1.49	4	25	0.72	14	1.5	2	4.0	7
Oliver's Ferry	0.76	3	27	0.53	14	4.5	2	4.0	6
Wyoming	1.75	4	26	0.37	12	2.0	7	5.0	6
Goderich	1.40	3	24	0.70	7	13.0	4	4.0	29
Georgetown	2.17	6	9	1.01	14	9.8	17	3.8	6
Orangeville	2.30	6	18	0.74	5	7.8	7	2.5	26
Sunshine	2.51	6	15	1.00	5	14.0	10	5.0	7
Hibey	1.67	2	27	0.94	4	5.0	2	3.0	5
Emmerson	1.60	2	7	0.80	4	17	1	4.0	7
Providence Bay	1.08	8	14	0.40	4	5.0	13	18.0	2
Deer Park	2.16	4	23	1.39	14	5.0	4	5.5	7
Kitley	1.18	3	24	0.65	14	5.0	4	5.0	6
Emisdale	0.97	3	13	0.65	4	30.5	18	9.0	7
Aurora	1.33	4	17	0.72	4	7.0	11	2.8	6
Croydon	0.23	3	22	0.12	14	6.5	6	4.0	28
Goldstream	0.93	5	18	0.87	14	9.0	8	3.5	29
Roblin's Mills	2.10	4	22	1.10	4	15.5	5	0.0	27
Parma	2.57	4	25	1.63	14	5.0	2	4.0	30
Ardan	2.37	7	18	0.98	4	9.0	6	3.0	9
Watford	1.45	2		0.75	13	No snow reported.			
Dewtown	1.91	7	22	1.04	13	2.0	4	2.0	5
Searboro	2.22	5	17	1.47	14	5.1	9	4.0	6
Cutton	2.15	3	27	0.97	13		1		29
Huntsville	1.58	2	19	1.16	4	14.0	11	11.0	27
Midland	1.44	4	16	0.60	4	8.0	11	4.0	31
Thompson	1.30	1	25	1.30	4	19.5	5	8.0	23
Elgin	1.41	2	26	0.91	4	7.0	3	5.0	7
NEW BRUNSWICK.									
Point Escomine	0.12	5	20	0.05	5	2.8	9	0.8	17
NOVA SCOTIA.									
Port Morden	1.56	2	21	1.38	25	17.5	8	5.0	17
P. E. ISLAND.									
Port Hill	0.58	4	23	0.40	25	16.5	5	5.0	1

FORECASTS OF JANUARY

The forecasts issued by this office at 10 p. m. on December 31, 1928, are for the 24 hours beginning on January 1, 1929. The number of predictions issued during the month was 857, divided as follows:

District	N. of Predictions	Verdict		
		No. Partly Verified	No. Fully Verified	Percentage
Montreal	34	11	6	79.4
Lake Superior	8	18	4	84.7
Lake Erie Region	5	2	1	78.0
Georgian Bay	1	25	4	75.7
Ottawa Valley	90	11	27	81.7
Upper St. Lawrence	6	14	7	84.6
Lower St. Lawrence	1	6	5	84.6
Gulf	1	13	6	83.2
Maritime Provinces	1	26	15	77.6
Total	857	145	95	80.8

In order to obtain the percentage of verification of the forecasts, the number partly verified is divided by two and added to the number fully verified, and the result divided by the number issued.

In ascertaining to what extent the predictions have been verified, the forecasts from the agents at all observing stations, as well as the telegraphic reports, are used.

METEOROLOGICAL OFFICE,
Toronto, February 26th 1929.

R. E. STUPART,
Director.

METEOROLOGICAL SERVICE, DOMINION OF CANADA.

Monthly Weather Review.

VOL. XXIII

FEBRUARY, 1899.

No. 2

INTRODUCTION

In compiling the present Review the principal data made use of are the telegraphic reports of observations received at this office for the purpose of weather forecasting, and reports by mail from voluntary observers and storm signal agents. For the material use in tracing the paths of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

REMARKS ON THE WEATHER.

The weather throughout Canada was remarkable for low mean temperatures and light precipitation, the former being below average everywhere excepting over a portion of Quebec, and the latter below in every province excepting British Columbia. The minimum temperatures which were exceptionally low in many portions of the country occurred generally on or before the 13th, and during the latter half of the month the cold weather was more moderate. In some districts the ground was either bare or only had a light covering of snow during the greater part of the month and some anxiety was expressed for the grain crops by the farming community.

In British Columbia the weather was unusually cold and stormy and the amount of precipitation was heavy in most districts. There were some exceptionally low temperatures during the month, namely, -39.0 at Barkerville on the 3rd, -39.9 at Midway on the 3rd, and -39.9 at Donald on the 4th; -23.5 at Nicola Lake on the 3rd, and -23.4 at Tobacco Plains on the 11th. Owing to the severe weather, vegetation was very backward at the end of the month.

The weather in the North-West Territories was intensely cold, fine, and comparatively dry, the mean temperature being from 4 to 12 below average, and the precipitation somewhat below. The most severe weather of the month occurred on or before the 11th, temperatures between -40 and -50 being recorded in most districts and -52 being reported from Knochhill. From the 12th to the 20th the weather was comparatively mild and the highest temperatures recorded, which were from 40 to 56 , occurred on or about the 18th. After the 20th, the weather was cold and continued so to the 28th. On the last day of the month the depth of snow on the ground was from 2 to 8 inches, and sleighing after the 18th was very bad in many districts.

In the Province of Manitoba the sequence of the weather was much the same as in the Territories, and the cold was equally intense. The date on or about which the minimum temperature occurred was also the same and between -43 and -52 were recorded. The depth of snow on the 28th varied with the locality, from one to fifteen inches being reported.

The weather in Ontario was unusually fine, and bright, and exceedingly cold up to the 15th. The mean temperature was several degrees below average throughout the province, and exceptionally low temperatures occurred generally about the 11th. In the coldest and most northern districts minima between -40 and -55 were recorded, whilst in the most southern counties from -12 to -20 were reported. The weather during the second half of the month was much milder and the precipitation during this period was mostly rain in the southern and snow in the northern portions of the province. In districts bordering the Lower Lakes the ground was bare, whilst in more northern districts there was good sleighing throughout the month.

In the Province of Quebec the weather was about normal, and the sequence was similar to that in Ontario, it being much colder during the first than during the latter half of the month. The precipitation was mostly snow, and there was good sleighing throughout the month.

The weather was fine and very cold in New Brunswick during the first half of the month, but it was not so severe as in the more western provinces. During the latter half of the month it was comparatively mild.

Both the mean temperature and rainfall were below average, though the latter since the middle of the month was not great. There were four gales during the month, and on the 13th and 14th the most severe gale occurred, when there was heavy drifting snow which blocked both street and railway traffic.

The weather conditions in Nova Scotia were much the same as in New Brunswick, both the temperature and rainfall being somewhat below average, and the coldest weather occurring during the first fifteen days of the month. During the period of milder weather when the temperature rose well above 40° at many places and rain occurred, much of the snow was melted, and on the 28th the ground was bare throughout the greater part of the Province.

In Prince Edward Island the weather was extremely bright and fine, there was, however, continuous and extremely cold weather during the first half of the month, and the mean temperature was below average. Milder weather prevailed after the 15th, and it became more unsettled. The precipitation which was also below average was mostly snow. A heavy gale with rain occurred on the 13th, and part of the 14th. F. T. PAYNE.

ATMOSPHERIC PRESSURE.

The mean distribution of pressure was decidedly more abnormally low on the Pacific Coast, the pressure was as much as +150 of an inch above average, the amount of excess diminishing as it went until the normal was reached at a line drawn southeastward from Battleford to Qd Appelle. Throughout the large remaining portion of Canada pressure was everywhere below average, the deficiency reaching 150 of an inch in the Gulf of St. Lawrence and the Cape Breton Coast, and further west again over Newfoundland the deficiency was as much as +300 of an inch.

HIGH AREAS.

There were only four areas of high pressure, all of which were difficult to be traced but No. 1, which was of unusual importance and persistency existed on the continent during the first sixteen days of the month. No. 2 was the area of next importance.

No. 1 was probably one of the most persistent anticyclones on record, and the weather of the whole of Canada came under its influence. On the 31st of January it passed over Northern Alberta in rear of high areas No. 7 and 8 on the January chart. From the 1st until the morning of the 11th, the main area was centred in the North-West Territories or State, more frequently in the former than in the latter, and apparently it was further strengthened during this prolonged interval, as two subsidiary areas. The system reached its maximum in the early morning of the 11th when the barometer at Swift Current was 31.42 inches reduced to sea level. By the night of the 11th the main body of the area had travelled southwards to Dakota whence it moved slowly to Texas gradually diminishing in energy. On the 13th, the system recurved north-eastwards from Texas and on the 16th dispersed over the Maritime Provinces. In the Territories and Manitoba the 1st to the 11th, was probably one of the most severe periods ever experienced in the country, the minimum night temperature was usually between 30° and 40° below zero, and the maximum, except in Alberta on the 4th, 5th, 6th, and 11th, never rose above zero. Very cold weather was also experienced up to the 15th in Ontario, Quebec and the Maritime Provinces. British Columbia also had a severe spell of cold weather. No. 2 was also an area of considerable importance, it moved into the North-West Territories on the 21st and at night was centred over Alberta when on the morning of the 22nd the barometer reduced to sea level was 31.00 inches and upwards. It then travelled southeastwards to the Upper Mississippi Valley and on the 24th recurved north-eastwards to the Lower Lake Region and thence over the Maritime Provinces. It was attended by a return to decidedly cold weather in all localities which, however from the Lake Region to the Atlantic Coast, soon gave way again to mild conditions. No. 3 was an area of moderate energy. It passed into the North-West Territories on the night of the 24th and then travelled southeastward to the South Atlantic States where it dispersed. No. 4 was seemingly subsidiary to No. 3. It was situated as a feeble area in the North-West Territories on the 27th. It moved southward towards the Lower Mississippi Valley, thence between the 3rd and 14th of March over the Lower Lake Region to the Atlantic Coast becoming somewhat energetic as it passed over the Maritime Provinces.

Between the 16th and 20th several minor Highs passed southward from the Pacific States to the region of the Gulf of Mexico and then broke up but none of these were well enough defined to be definitely traced.

LOW AREAS.

Eleven areas of low pressure were charted during the month, and the most important of them were those which travelled from the Region of the Gulf of Mexico and thence up the United States Atlantic Coast to the Maritime Provinces.

No. 1 was a moderate depression which on the 1st travelled from the Middle Pacific States to Texas thence north-eastward to the Jersey Coast and to the southward of Nova Scotia. Owing to its influence light falls of snow occurred from the lakes to the Atlantic between the 3rd and 14th. No. 2 first gave signs of a marked develop-

ment when over the South Atlantic States on the morning of the 7th. It probably originated over the Pacific Coast and appears to have been the last of a series of minor disturbances from the Pacific. As it moved up the Atlantic Coast it developed into a severe storm and during the evening of the 8th swept over the Maritime Provinces attended by fresh gales and a fall of snow. The barometer at Yarmouth in the St. Lawrence and Ottawa Valleys and at the same time there were light falls of snow in the Lake Region. No. 3 was the most important area of the month in that it gave the heaviest general snowfall in Canada. It appeared near Florida on the 12th and travelled quickly up to the United States and Canada developing rapidly; on the morning of the 14th when centred in the Gulf of Mexico the barometer at Yarmouth was reading 28.62 inches reduced to sea level; a heavy gale and snow storm prevailed throughout the Maritime Provinces, and the Gulf of St. Lawrence. No. 4 appeared in Northern British Columbia on the 12th and on the 13th it passed over the North-West Territories and Manitoba accompanied by a large northerly gale blowing together with light local snowfalls. On the 14th it dispersed over the North-West States. No. 5 was first well defined in Northern Alberta on the 14th, it afterwards travelled slowly over the Territories and Manitoba to the Lake Region and thence to the Lower St. Lawrence Valley. It was accompanied by a continuation of mild weather from the Rockies to Manitoba, and it brought a change to a cold belly and low weather from the Lakes to the Atlantic. During its presence there were also light falls of sleet or rain in nearly all places. No. 6 was a very moderate depression which appeared over Texas on the 14th, and afterwards travelled down the Gulf of Mexico to the United States Atlantic seaboard and eventually dispersed near the Cape Fear River. No. 7 was apparently a severe storm off our Atlantic Coast. During the 12th the disturbance, known as the Nova Scotia Coast, heavy rain falling in the Maritime Provinces, and at 8 p.m. the barometer at Yarmouth was 28.50 inches reduced to sea level. No. 8 was seemingly subsidiary to No. 5. It was centred in Northern Alberta on the morning of the 19th, and afterwards travelled eastward to the northward of Lake Superior as a depression of importance. It was probably the outcome of the merging of two or more minor areas. It travelled northeast to Lake Superior and thence, diminishing energy to the Gulf of St. Lawrence. It caused a fall of rain in the Lake Region, snow and rain in the St. Lawrence Valley, and rain with moderate gales in the Maritime Provinces. No. 11 was an area which moved with great rapidity. On the night of the 26th it was off the British Columbia Coast, and by the early morning of March 1st had reached the Gulf of St. Lawrence. In the Lake Region it was followed by a little depression from the Northwest. It caused light falls of rain or sleet from the Lakes to the Atlantic, except in the Georgian Bay Region where the precipitation was snow, and where the fall in many places was considerable.

WINDS.

The distribution of pre-mentioned meteorological pressure indicated a marked local barometrical gradient for westerly winds throughout Canada, and the table of wind directions shows such to be the case. In the North-west Territories the westerly direction was experienced on nineteen days. In Manitoba and Ontario on twenty-three days; in the St. Lawrence Valley on seventeen days, and in the Maritime Provinces on twenty-one days.

In the Territories and Manitoba the force of a gale was reached on three days and fresh to strong winds frequently prevailed. In the Lake Region there were three gales, twelve days of strong breezes and four days of fresh winds. In the St. Lawrence Valley, more especially in the eastern portion, many days of strong breezes were experienced and the force of a gale was reached five times. In the Maritime Provinces gales occurred on the 7th, 13th, 22nd and 26th; on the 19th also there was a gale along the Cape Breton Coast. The heaviest gale was that which prevailed on the 13th. In the latter Provinces where in many localities winter navigation is pursued the gales of the 7th, 12th and 23rd were amply warned, but in the case of the one of the 22nd the signals were lowered too soon, in fact at most places before the gale had set in, this was owing to a quick steepening of the barometrical gradient over the Maritime Provinces after the depression had passed out to sea.

TEMPERATURE.

Temperature was below average in all portions of Canada, except along the St. Lawrence Valley, between Montreal and Father Point, where it was from average to one degree above. From the coast line of British Columbia to the Lake Region, the amount below average was very considerable, and this was especially the case over Southern Alberta and also in Assiniboia, where the deficiency was as much as from 9° to 12°.

The Highest and Lowest Temperature, the Greatest Wind, and the Coldest Day of February, 1896, over

British Columbia,	66.0 on 19th at Quesnelle,	36.0 on 3rd at Midway and on 4th at Donald.
North-West Territories,	59.0 on 19th at Red Deer,	52.0 on 11th at Kneehill.
Manitoba,	41.0 on 26th at Russell.	52.0 on 3rd at Emerson.
Ontario,	55.0 on 26th at Cottam, Sarnia and on 27th at Windsor,	55.0 on 19th at Savanah.
Quebec,	44.0 on 18th at Brome.	34.0 on 5th at Chicoutimi.
New Brunswick,	47.5 on 21st at Moncton.	25.0 on 5th at Sussex.
Nova Scotia,	49.0 on 21st at Halifax.	15.0 on 2nd at Truro.
Prince Edward Island,	43.2 on 21st at Charlottetown.	7.0 on 11th at Hamilton.

PRECIPITATION.

Victoria reports precipitation 4.3 inches above the average; the average was also exceeded over the Lower Mainland of British Columbia, but elsewhere throughout the Dominion, if we neglect an excess of 0.5 inches at Medicine Hat, and 0.2 inches at White River, precipitation was nearly everywhere below average. In the Ottawa and the Upper St. Lawrence Valleys the deficiency was from 1.3 inches to 1.1 inches, and in the southwestern portions of the Lower Lake Region and the Maritime Provinces, it was below to about the same amount. In several parts of the North-West Territories no measurable amount of precipitation occurred.

From Quebec City to the Island of Anticosti there was from 24 to 55 inches of snow on the ground at the end of the month; this was considerably more than there was at the end of January. On the other hand, the amount on the ground in the Georgian Bay Region had on the whole, greatly diminished since the end of January; Parry Sound reporting 28 inches against 56 inches, and Owen Sound, 13 inches against 27 inches; however, in the Muskoka Lake District the amount was 32 against 37 inches last month. White River reported 27 inches on the ground, and Rockliffe 20 inches, Qu'Appelle 20 inches, and Minnedosa 24 inches. In Alberta, as well as over the southern portions of the Lower Lake Region and the Maritime Provinces there was none or only a very little.

THICKNESS OF ICE.

NORTH-WEST TERRITORIES AND MANITOBA.—Edmonton, 28 inches; Battleford, 24 inches. Medicine Hat and Swift Current, 30 inches; Minnedosa, 24 inches; Pembina Crossing, 23 inches.

ONTARIO. Port Arthur, 30 inches; Parry Sound, 23 inches, an increase of 8 inches since January; Southampton, 24 inches, an increase of 10 inches; Kingston, 18 inches; Rockliffe, 20 inches; Paris, 12 inches; Orillia, 21 inches; Midland, 27 inches; Stratford, 26 inches; Barrie, 26 inches, an increase of 11 inches; Stony Creek, 20 inches; Port Dover, 21 inches; Wharton, 20 inches; North Bruce, 18 inches.

MARITIME PROVINCES. Chatham, 18 inches; Yarmouth, 10 inches; Sydney, 30 inches; Charlottetown, 13 inches; Halifax, 18 inches.

BRIGHT SUNSHINE.

In British Columbia the ~~duration~~ amount of the possible amount of bright sunshine varied from average to slightly below, but in all other parts of the Dominion the average amount was exceeded the greatest general amount above occurring in the North-West Territories, Manitoba and in Ontario.

TEMPERATURE RECORDED AT DAWSON-YUKON DISTRICT DURING FEBRUARY.

Day.	Max.	Min.	Day.	Max.	Min.
1	2.2	5.9	15	4.0	3.2
2	1.2	16.6	16	18.2	58.2
3	4.0	4.0	17	24.0	46.9
4	6.0	0.8	18	0.1	22.7
5	6.0	0.0	19	9.0	15.2
6	6.4	18.0	20	13.8	37.0
7	1.4	26.6	21	16.5	11.1
8	1.0	22.5	22	11.9	37.6
9	11.0	32.4	23	5.9	30.6
10	7.0	32.4	24	2.5	25.6
11	7.0	7.4	25	2.3	21.2
12	7.0	1.5	26	6.6	—18.7
13	7.4	0.7	27	11.7	—27.9
14	4.3	0.0	28	12.8	—25.6
				2.3	19.6

Mean for Month, —0°.9.

It will be interesting to notice with regard to the comparatively mild winter prevailing in the Yukon Territory that at nearly all the stations reporting from the North-west Territories and Manitoba during February, a considerably lower temperature was registered, and that at Russell, in Northern Manitoba, a lower average temperature occurred. The same fact is observable at station to the north of Lake Superior, and even in the Parry Sound district a lower temperature was registered than at Dawson during February.

PRESSURE, TEMPERATURE, WIND AND PRECIPITATION AT STATIONS IN THE DOMINION OF CANADA, FEBRUARY, 1899.

a Barometer not reduced to Sea Level * Stations not furnished with Registering Thermometers.

STATION.	PRESSURE.			TEMPERATURE.			MEAN TEMPERATURE OF THE MONTH.			DIRECTION OF WIND FROM.			VELOCITY OF WIND.			PRECIPITATION.			No. of Foggy days.	No. of Thunder storms.	No. of Auroras.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
	Level, in feet.			From average.			Range.			Mean.			Amount.			Days with 0.1 or more in month.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
	Highest.	Lowest.	Range.	Mean.	Difference.	Years of service.	Highest.	Lowest.	Range.	Mean.	Mean relative humidity.	Mean amount of cloud.	N.	S. E.	S. W.		W.	C.				Total number of hours.	Mean miles per hour.	Highest day's velocity.	Rate and direction from.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
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Victoria	29.90	29.24	29.25	30	72	5	48.1	8.1	46.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0</

PRESSURE, TEMPERATURE, WIND AND PRECIPITATION AT STATIONS IN THE DOMINION OF CANADA, FEBRUARY, 1900

c. Parameter not reduced to sea level.

STATION.	Latitude N.	Longitude W.	PRE-SIRE.			TEMPERATURE.				Direction of Wind from	DIRECTION OF WIND FROM						VALUITY OF WIND.			Precipitation.	No. of days.	No. of fogs.	No. of hours.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
			Mean re level.	Highest.	Lowest.	Mean.	Difference from average.	Years observed.	Highest.		Lowest.	Mean daily range.	Mean relative to low point.	Mean amount of monthly.	No. of days complete.	N.	N.E.	S.E.	S.					S.W.	W.	N.W.	Total number of hours.	Mean miles per hour.	Highest days velocity.	Date and direction from.	Amount.	Difference from average.	Heavyest fall in month.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
N.W. Head (Polaris Cove).	42° 15' N.	71° 15' W.	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

PRECIPITATION AT STATIONS REPORTING RAIN, SNOW AND WEATHER, DURING
FEBRUARY, 1899.

STATIONS.	RAIN.					SNOW.					REMARKS.
	Amount in inches.	Days of Over.	No. of Fair Days.	Heaviest Fall in Month.	Date.	Amount in inches.	No. of Days.	Heaviest Fall in Month.	Date.		
BRITISH COLUMBIA—											
Nanaimo	3.28	8	18	0.90	28	14.0	2	9.0	6		
Beaver Creek	5.96	12	12	1.11	26	9.5	5	4.0	7		
Langley	5.14	12	14	1.88	13	7.5	2	5.0	6		
Royal Oak	4.67	14	11	1.10	26	13.0	5	7.0	6		
Goldstream Lake	8.54	12	13	1.68	26	13.5	4	8.0	7		
Salt Spring Island	3.45	11	14	1.10	26	11.7	3	10.7	7		
Cumberland	3.05	8	15	0.78	14	13.8	5	7.5	6		
NORTH-WEST TERRITORIES—											
West Beaver Hills	0.03	1	21	0.03	14	2.6	5	1.0	8	10th-48	
MANITOBA—											
Morden						1.5	8	1.0	12		
Belmont							3				
Norquay						4.0	5	1.5	26	8th-48, 9th-48, 10th-45, 10th-42.	
Grtna	8		27				2			6th-49	
Shoal Lake							2				
Pilot Mound						2.0	4	1.0	16	6th-47, 7th-52, 8th-58, Snow on level 15 in.	
Pembina Crossing							5				
ONTARIO—											
Ennismore	0.10	1	24	0.10	28	4.5	3	2.0	3	10th-18	
Roblin's Mills	0.28	3	25	0.10	28					10th-48, 10th-45, 10th-42.	
Huntsville	0.65	2	21	0.45	26	9.0	5	5.5	28		
Coldstream	1.35	5	19	0.55	22	4.7	6	2.0	23	11th-28, 12th-28	
Ardley	0.82	4	20	0.43	23	11.0	8	3.0	26	11th-28, 12th-30,	
Kitley	1.10	4	19	0.48	27	7.5	8	2.0	9	12th-27,	
Scarboro	1.13	5	14	0.72	22	2.8	19	1.8	3	11th-14,	
Watford	1.80	3		0.92	26						
Dutton	1.77	4	22	0.84	21	4.0	2	2.0	3		
Dealtown	1.52	7	20	0.74	22		3			11th-17,	
Oliver's Ferry	0.25	1	25	0.25	27	7.0	2	5.0	22	10th-11,	
Wooler	1.25	5	20	0.47	22	5.0	6	3.0	3	12th-24,	
Mt. Pleasant	0.28	4	19	0.11	15	2.5	7	1.0	3		
Metrague	0.25	1	24	0.25	27	1.0	3	3.0	7	10th-25, 11th-26,	
Aurora	0.43	3	16	0.35	26	7.8	9	2.8	22		
Princeton	1.71	5	19	1.03	22	7.0	7	2.0	3	9th-21, 10th-16, 14th-20, 15th-22	
Warton	1.00	3	17	0.70	26	13.0	5	6.0	27	2nd-26, 11th-32, 12th-34	
Sparrow Lake	6	0	22	6		3.4	4	3.0	27	2nd-4, a terrible wind storm.	
Thompson	0.25	1	26	0.25	15	4.5	3	2.0	2	6th-16, 7th-16,	
Ursa			23			16.0	5	5.0	28		
Parma	0.36	3	21	0.32	27	7.0	3	3.0	4		
Croydon	0.95	2	22	0.60	27	6.5	4	3.0	2	12th-22	
Lansdowne	0.93	12	23	0.48	4	3.5	3	2.0	7		
Georgetown	0.81	7	15	0.25	26	10.3	9	1.8	22		
Orangeville			16			17.0	12	9.8	22		
Coderich	0.03	2	23	0.03	26	4.0	3	1.0	28		
Providence Bay	0.11	2	16	0.10	27	27.0	10	12.0	28		
Ensdale	0.29	1	21	0.29	26	14.0	6	8.0	28		
Cherry Valley	0.45	3	24	0.20	26	1.0	1	1.0	19		
Sunshine	0.55	3	19	0.43	27	2.0	6	1.0	19	8th-20,	
Lion's Head	0.26	1	—	0.26	26					26th, first thunder of year	
Jermyn			26			8.0	2	4.0	3-20		
Elgin	1.20	1	24	1.20	27	8.0	3	5.0	3	11th-16, 12th-16,	
Wyoming	1.65	2	26	1.30	26						
Hibrey	0.50	2	24	0.50	27	8	2				
NEW BRUNSWICK—											
Poinc Esquimaux						1.5	5	0.5	9		
NOVA SCOTIA—											
Port Morien	0.48	2	20	0.48	28	15.0	6	6.0	14		
P. E. ISLAND—											
Port Hill	0.40	1	21	0.40	27	27.0	7	12.0	14		

Aurora recorded:—

Where the class of *aurora* is noted by the observer, it is given, (I) being the brightest, (IV) the faintest in brilliancy.

1. Pembina crossing, IV : Aweme, IV. Savanne.
2. Pembina crossing, IV : Belmont, Treherne. Aweme, II : Red Deer, IV : Duck Lake, IV.
3. Russell, IV : Battleford, IV : Pembina Crossing, III.
5. Russell, IV : Pembina Crossing, IV : Clontarf, IV : Red Deer, IV.
7. W. Beaver Hills IV. Savanne. Owen Sound.
8. Russell, IV : Toronto, IV : Pembina Crossing, II : Belmont, Georgetown, IV : Aweme, III. Regina IV : Savanne, Muscowpetung, II.
9. Russell, III : Minnedosa, III : Pembina Crossing, IV : Belmont, Regina, IV : Savanne, Moose Jaw.
10. Minnedosa, IV : Battleford, IV : Pembina Crossing, IV : Regina, III : Savanne, Muscowpetung, I. Calvin I : Moose Jaw.
11. Truro, IV : Russell, II : Gravenhurst, III : Coldwater, IV : Toronto, III : Fredericton, IV : Charlottetown, IV : Kingston, III : Quebec, III : Battleford, II : Pembina Crossing, IV : Belmont, Huntsville, II : Midland, II : Georgetown, IV : Treherne, Aweme, II : St. Stephen, I : Regina, III : Erasmus, Bancroft, II : Clontarf, IV : Cottam, Birnam, IV : Stony Creek, IV : Port Dover, Welland, IV : Savanne, Tagish, Cannington, Manor, III : Gatesgarth, Duck Lake, III.
12. Russell, II, Gravenhurst, IV : Toronto, IV : Fredericton, IV. Banff, III : Quebec, III : Minnedosa, Swift Current, White River, II : Ottawa, II : Pilot Mound, I : Midland, II : Georgetown, IV : Perce, IV : Alton, III, Cockburn Island, Clontarf, III : Birnam, III : Stony Creek, III : Bognor, III : Savanne, Red Deer, Duck Lake, III. Calvin II : Moose Jaw. Barrie.
13. Toronto, IV : W. Beaver Hills, II : Huntsville, I : Bognor, I. Moose Jaw,
14. Russell, II : Montreal, IV : Treherne, Aweme IV.
15. Pembina Crossing, IV : Muscowpetung.
16. Medicine Hat, III : Aweme, III.
17. Pilot Mound, III.
18. Richmond.
20. Pembina Crossing, IV : Pilot Mound, II : Tagish, II : Cannington Manor, II : Duck Lake, IV.
21. Pilot Mound, II : Regina, III.
22. Savanne.
23. Russell, III : Toronto, IV : Kingston, III : Savanne.
24. Toronto, IV.
25. Aweme, III. Red Deer, II : Duck Lake, IV.
26. Russell, IV.
27. Russell, I : Quebec, III : Pembina Crossing, II : Huntsville, Georgetown, IV : Treherne, Regina, II Lucknow, Savanne, Red Deer, IV : Cannington Manor, Muscowpetung.
28. Russell, IV : Prince Albert, II : Pilot Mound, III.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE THE HORIZON IN THE MONTH OF FEBRUARY, 1896.

	HOURS ENDING.															
	5 a.m.	6 a.m.	7 a.m.	8 a.m.	9 a.m.	10 a.m.	11 a.m.	Noon.	1 p.m.	2 p.m.	3 p.m.	4 p.m.	5 p.m.	6 p.m.	7 p.m.	8 p.m.
Esquimalt.....				0.02	0.18	0.23	0.29	0.27	0.29	0.29	0.28	0.21	0.08			
Kuper Island.....				✓	0.12	0.20	0.27	0.18	0.39	0.34	0.40	0.38	0.19	✓		
Agassiz, B.C.....				0.00	0.03	0.18	0.22	0.20	0.23	0.26	0.29	0.21	0.05			
Battleford.....			0.18	0.52	0.73	0.73	0.78	0.76	0.81	0.78	0.71	0.39	0.01			
Indian Head.....			0.06	0.30	0.70	0.74	0.74	0.71	0.67	0.50	0.25	0.04				
Brandon.....			✓	0.30	0.05	0.02	0.00	0.77	0.77	0.74	0.67	0.54	0.20			
Winnipeg.....				0.10	0.27	0.44	0.61	0.65	0.64	0.64	0.60	0.50	0.12			
Durham.....				0.06	0.16	0.30	0.34	0.36	0.34	0.31	0.32	0.29	0.15			
Woodstock.....				0.03	0.14	0.37	0.50	0.54	0.50	0.49	0.44	0.44	0.18			
Toronto.....				0.16	0.45	0.55	0.66	0.64	0.61	0.54	0.56	0.55	0.31	0.04		
Lindsay.....				0.10	0.31	0.40	0.50	0.61	0.58	0.55	0.50	0.47	0.37	0.17		
Barrie.....				0.15	0.46	0.49	0.50	0.56	0.57	0.49	0.50	0.45	0.15	✓		
Kingston.....			0.00	0.27	0.45	0.77	0.59	0.50	0.61	0.55	0.57	0.43	0.20	0.04		
Ottawa.....				0.11	0.24	0.29	0.34	0.47	0.52	0.56	0.55	0.41	0.15			
Montreal.....				0.18	0.41	0.53	0.47	0.54	0.54	0.55	0.57	0.40	0.07			
Fredericton.....				0.18	0.43	0.51	0.55	0.60	0.61	0.61	0.55	0.53	0.32	0.03		
Mean proportion for month (Constant's inclination being 45°)	0.22	0.27	0.16	0.61	0.45	0.57	0.48	0.25	0.35	0.48	0.44	0.41	0.47	0.35	0.48	0.48
Difference from average.....	00	04	05	17	12	17	07	07	13	13	15	12	00	06	04	
Maximum daily amount.....	0.88	0.86	0.75	0.87	0.82	0.85	0.87	0.78	0.86	0.92	0.96	0.86	0.92	0.88	1.00	0.89
Date.....	3.5	2	4	9	28	11	23	7	10	2	12	12	11	14	24	2
No. of days completely clouded.	11	10	19	1	4	1	2	15	4	2	5	4	5	8	8	6

FORECASTS.

The forecasts issued by this office at 11 p. m. each night are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 859. These were divided as follows:—

DISTRICT.	No. Issued.	VERIFIED.			
		No. Fully.	No. Partly.	No. Not.	Percentage
Manitoba.....	84	75	5	4	92.3
Lake Superior.....	88	73	6	9	86.4
Lower Lake Region.....	97	78	13	6	87.1
Georgian Bay.....	96	79	12	5	88.5
Ottawa Valley.....	91	78	9	4	90.7
Upper St. Lawrence.....	91	76	11	4	89.5
Lower St. Lawrence.....	97	83	10	4	90.7
Gulf.....	104	91	8	5	91.3
Maritime Provinces.....	111	92	10	9	87.4
Total.....	859	725	84	50	89.3

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by two and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent the predictions have been verified, the reports from the agents at all observing stations, as well as the telegraphic reports, are used.

The storm warnings and forecasts for February were issued by Forecast Official B. C. Webber.

PHENOLOGICAL OBSERVATIONS.

E. F. PARNI.

It would appear from the few observations of phenological phenomena and the desultory manner in which they are recorded by meteorological observers that their value is not fully appreciated—or is not properly understood. Taking this for granted it may be well to make a few suggestions in the hope that at least a few observers will add to their observations notes upon these phenomena.

It is well known that to a large portion of any intelligent community meteorological averages or other data expressed in figures are of little value as a means of conveying information. On the other hand if, in describing the climate of a district, the same people are informed of the date when certain well known plants bloom or other seasonal changes take place a picture of the climatic conditions is formed at once in their minds. This being the case and as a very important branch of the meteorologist's duty is to convey information of these conditions the usefulness of phenological observations should be duly recognized.

In a small district it would be better to suggest for observation certain well known phenomena, but where the area to be covered is large as in Canada only general suggestions can be made.

Accuracy in identifying the object observed is all important, therefore it is far better to confine the observations to phenomena well known to the observer, remembering that a note of the date of blooming of a little known plant or the arrival of a rare bird is usually of less value than notes upon common species. Observations also of sports out of season, which are due to quite local conditions, while interesting, are of little value and should not be recorded excepting in parenthesis. As one swallow does not make a summer neither does the appearance of any other single species of bird or plant indicate fairly the season, nevertheless these may be noted with a remark that they are the only ones seen.

The following is a list of phenomena which might be observed together with remarks.

Botany. Dates of budding or flowering or fruiting or defoliation of plants and trees *i. e.* leaves fully expanded; buds quite formed; flowers turned upward and stamens visible; fruit or seeds ripe; leaves falling or withered. One or all of these changes might be noted. Wild plants and trees should usually be chosen for observation in preference to cultivated ones; this however does not apply to agriculture, observations of which are very important. In recording the changes in vegetation as far as possible the same trees or plants should be observed and at least the observations should be made in the same locality.

Ornithology. Dates when birds are first seen, when numerous and when last seen, also migration of birds which usually occur upon still nights when, although the species may not be known by their note, they may often be distinctly heard, and this fact is well worth noting. The date of nesting might also be noted. Birds will often be found in a certain locality year after year much earlier than in the surrounding country, and if this occurs a remark to that effect should be noted against the bird observed.

Entomology. Dates when several of the same insect are first seen and when it becomes common. The larvae of butterflies often enter buildings to undergo transformation and are therefore liable to develop earlier than those out of doors; in such cases it is not advisable to enter them. It is especially desirable to note the white Cabbage-Butterfly, Cuck-Chafer, Bee and Mosquito.

Miscellaneous. Dates of ploughing, sowing, harvesting, floods, opening and closing of rivers and lakes, thickness of ice, frogs piping, first earth worms in Spring indicating that frost is out of the ground, &c., &c.

R. F. STUPART,
Director.

METEOROLOGICAL OFFICE,
Toronto, March 27th 1899.

METEOROLOGICAL SERVICE, DOMINION OF CANADA.

Monthly Weather Review.

VOL. XXIII

MARCH, 1899.

No. 3

INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather forecasting, and reports by mail from voluntary observers and storm signal agents. For the material used in tracing the paths of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

REMARKS ON THE WEATHER.

The weather in Canada during March was unusually cold and although it moderated somewhat on the last few days of the month there was little sign of approaching spring. The only exception to these conditions was in British Columbia where in many districts the temperature was average or rather above, and at a few points quite locally in other portions of the country where these latter conditions also prevailed. Added to the low temperature was the exceptional depth of snow at the end of the month, it being greater nearly everywhere than at the end of the preceding month. Similar abnormal conditions were noticeable in the total precipitation, it being above average generally, excepting in British Columbia where it was average in most places or somewhat below.

In British Columbia there was much fine bright weather, and although the temperature fell below the freezing point rather frequently in western districts, and below zero at many places in the eastern portion, the mean was about average. The precipitation which was mostly snow in eastern and rain in western districts was in most places average or rather below. Owing doubtless to the many exceedingly low night temperatures, vegetation was very backward on the last day of the month.

The chief characteristic of the weather in the North-west Territories was the exceedingly low mean temperature it being as much as 18° below average in southern Alberta, this deficiency decreasing to the north and northeastward. The precipitation was somewhat above average and altogether the weather was unusually severe, showing no sign of moderating at the end of the month.

In the Province of Manitoba the weather, though for the most part fine and bright, was exceptionally cold, and although the mean temperature was not so low as in the Territories it was from 8° to 15° below average. The snowfall was rather small, but there was sleighing throughout the month. Some quite severe storms passed over the province and the snow was much drifted.

The weather in Ontario was unusually cold and exceedingly unpleasant throughout the greater part of the month, the signs of spring expected being absent on the last day as on the first. High winds and gales occurred frequently, and added to this exceptional weather were several thunderstorms causing loss of life and some damage to property. The amount of precipitation was above average, snow prevailing in northern and rain in southern counties. There was fair sleighing in most districts throughout the greater part of the month.

The cold weather in Ontario also extended to Quebec where it was equally stormy and unpleasant and there was no sign of approaching spring at the end of the month. The precipitation which was mostly snow was unusually heavy in most districts and at Quebec the depth on the last day was 11·6 inches, of which a large portion fell during March. The lowest temperatures occurred in most places on or about the 17th—22·5 and—22·8 being recorded at Richmond and Chicoutimi respectively.

In New Brunswick the weather conditions were much the same as in Quebec, it being cold and stormy with much snow; and the signs of spring usually present in the latter part of March were altogether absent. Temperature well below zero occurred in many districts up to the 20th, the lowest being—17·0 on the 15th at Chatham. The depth of snow in the woods inland was three feet in many districts, whilst in many places along the shores of the Bay of Fundy it was only a few inches.

The weather in Nova Scotia was chiefly remarkable for the rapid changes which took place, cloud and sunshine following in quick succession during the greater part of the month. Many storms passed over the province and altogether the weather was exceedingly unpleasant although the temperature was not much below average. The precipitation which was mostly rain was above average in most districts.

In Prince Edward Island the weather during the first week was unusually mild, after which it turned cold and continued so until about the 24th when it moderated and was comparatively mild to the 31st. The storms affecting New Brunswick were also felt in this province but there was more bright sunshine. Altogether the weather did not differ much from normal.—F. F. PAYNE.

ATMOSPHERIC PRESSURE.

The mean pressure for the month was slightly below the average in British Columbia and generally above to the amount of about .10 of an inch throughout the North-west and Manitoba. From Lake Superior to eastern Quebec it was slightly below, but in eastern Quebec and the Maritime Provinces the pressure generally exceeded the mean to a slight amount.

HIGH AREAS.

High areas were numerous and in many cases of large extent; in nearly every instance they first appeared over the North-west or British Columbia, in three cases the movement was south but in all the rest, either east or south-east across the continent.

No. 1 was centred over Ohio on the morning of the 1st, and was comparatively unimportant. It moved south eastward to the Maritime Provinces, hovered there until the 4th and then moved off the coast. It had first appeared over the North-west on the 27th and was designated as area No. 4 on the February chart. No. 2 was an area of moderate energy which was first shown on the chart over Alberta on the 2nd; it was accompanied by decidedly low temperature and dispersed on the 4th to the north of Lake Superior. No. 3 apparently moved in from the Pacific on the 4th. By the 6th it had spread throughout the North-west and had extended southward to Mexico, accompanied by cold weather everywhere, the cold being extreme in Manitoba and the North-west; it then travelled to the Southeastern States and passed off the Atlantic coast. No. 4 first appeared over the North-west on the 8th and was of little importance there; it thence moved eastward to Lake Superior and then southeastward as a more extensive area over Ontario and the Maritime Provinces, passing off the New England coast on the 10th. No. 5 was an area of small proportions centred over Alberta on the 9th. It moved eastward to Manitoba and by the 13th had become an extensive area spreading from Manitoba to the Atlantic and southward to Florida. It was accompanied generally by fair cold weather throughout its course eastward from the Rocky Mountains and passed off the Nova Scotia coast on the 15th. No. 6, this became an area of some importance over the North-west, first appearing there on the 13th, attended by fair cold weather; it passed eastward over Ontario on the 17th, and off the Atlantic coast on the 18th and brought fine quite cold weather from the Lakes to the Atlantic. No. 7 was apparently subsidiary to No. 6; developing on the 17th over the North-west it passed southward and soon disappeared. No. 8 appeared over Northern Alberta on the 18th and quickly assumed the proportions of an important area. On the 20th it extended from the North-west to the Gulf of Mexico and was attended by extremely low temperatures throughout the North-west. After the 20th it decreased in energy as, accompanied by low temperature, it moved southeastward to the Atlantic coast, which it reached on the 21st and then took a northeasterly course to Labrador. No. 9 did not show much energy, although it became rather extensive for a time. Between the 21st and 25th it passed southeastward from the North-west Territories to the middle Atlantic coast. No. 10 was centred over Alberta on the 25th, whence it moved quickly southward to Texas and then eastward and off the Florida coast. No. 11 first appeared over the Lower Lakes on the 26th and moved as a small and unimportant area by an erratic course eastward to the coast and then northeastward to Newfoundland. No. 12 started over the North-west on the 29th and at first apparently moved westward, then took a southerly course and at the end of the month was centred over Colorado, extending from the North-west south to Mexico and from the middle Pacific coast eastward to the lakes, being attended by more moderate temperatures than those preceding it. Eventually it almost entirely dispersed, what remained of it passing off the middle Atlantic coast on April 1th.

LOW AREAS

The tracks of fifteen low areas have been charted during the month, two of which came from the Pacific or British Columbia and passed east and south-east across the continent, one came from the north-west States and moved due east to the lakes, three from the middle western States, moving at first south-eastward and then north-eastward, five from the south-west States, moving generally north-eastward, two from the middle eastern States, one passing out to sea and the other up the coast and over the Maritime Provinces and two started at the middle Atlantic coast and passed north-eastward.

No. 1 was, small and unimportant area, which on the morning of the 1st was centred over Montana, whence it moved eastward to the Upper Ottawa Valley and dispersed. It caused some snowfalls throughout the North-west, Manitoba, and northern Ontario. No. 2 was a shallow depression of short duration, which started over Ohio on the 2nd, and dispersed next day to the southward of Nova Scotia after giving a moderate snowfall in the southern portion of the Maritime Provinces. No. 3 appeared over Indian Territory on the 2nd and took a north-easterly course, developing into an important cyclone on reaching the lakes, whence it continued in its north-easterly course, passing to Labrador. During its passage fresh to strong gales prevailed from the lakes to the Atlantic accompanied by a fall of snow or rain. No. 4 was a very slight depression when it first appeared on the morning of the 6th over Tennessee. It moved at first south-eastward to the Atlantic coast where it quickly developed into an important cyclone and then taking a north-easterly course up the Atlantic coast passed over the Maritime Provinces to Newfoundland; a fresh to heavy gale with snow and rain attended it as it crossed eastern Canada. No. 5 moved in from the Pacific and over British Columbia, its centre not being clearly defined until the evening of the 7th when it was near Calgary. It was a depression of moderate energy and passed with decreasing energy eastward across the North west and then south-eastward and off the middle Atlantic coast. No. 6 was first defined on the chart on the morning of the 9th as centred in Utah. It took a rapid course first south-eastward, then north-eastward to the lakes and then east passing over the Maritime Provinces on the night of the 12th. It attained considerable energy on reaching the lakes where it gave high winds and a fall of snow or rain, but decreased somewhat in energy on its course further eastward although the same characteristics attended it there as at the lakes. No. 7 apparently came from Mexico and was centred on the morning of the 11th over Kansas. It developed considerable energy on its way north-eastward to the lakes, where it was attended by fresh gales, snow and rain and local thunderstorms, the precipitation being in some places excessive. From the lakes it moved eastward to the Maritime Provinces which it reached on the 16th and then passed out to sea. It was attended throughout eastern Canada by a moderate to fresh gale and the same conditions as regards precipitation as over the lakes. No. 8 was first fairly well defined on the morning of the 16th as centred over Colorado, whence it took an easterly course to Pennsylvania, increasing in energy as it travelled and giving high winds and light snow in Ontario on the 19th. Then taking a northeast course it continued to increase in intensity and on reaching the Maritime Provinces had become a very important cyclone, the barometric reading at Chatham, N. B., on the morning of the 20th being 28.72 inches reduced to sea level, and a heavy gale was blowing from the lake region eastward to the Atlantic and heavy precipitation occurred in the St. Lawrence Valley and Maritime Provinces accompanied by local thunderstorms in the latter. It passed off the Gulf coast during the 29th.

No. 9 formed during the night of the 20th in the south-west States and moved quickly north-east to the lake region where it caused a fall of rain or snow. It was otherwise unimportant and soon dispersed over the lakes on the 22nd. No. 10 was centred over Indian Territory and Arkansas on the morning of the 22nd and took the same course as No. 9 to the lakes, but continued further north-eastward dispersing over eastern Quebec. It caused strong winds and gales with snow or rain and local thunderstorms in the lake district and although afterwards decreasing in energy it caused heavy snowfalls in eastern Ontario and Quebec. No. 11 was a small depression which first appeared on the Middle Atlantic coast on the morning of the 23rd and moved north-eastward to the Maritime Provinces, where a moderate development occurred, and strong winds with a fall of snow took place. It eventually dispersed over Nova Scotia on the 25th. No. 12 appeared over British Columbia on the 24th and was centred at night over western Alberta whence it took a southeasterly course to Iowa and then an easterly course to and off the middle Atlantic coast on the 26th. It was a depression of moderate energy and caused local falls of snow and rain throughout its course. No. 13 was centred over the western portion of the Gulf of Mexico on the 26th and moved quickly north-eastward over the lake region to the Gulf of St. Lawrence, which it reached on the 30th. As it travelled across the continent it developed considerable energy and during the night of the 28th a secondary developed near the middle Atlantic coast, and next morning was centred in Maine, while the primary was centred near Montreal, and one of the heaviest gales of the season set in between the lakes and the Atlantic. The two soon joined and the combined system moved north-eastward with diminished energy. No. 15 was apparently centred as an ill-defined area over Utah on the morning of the 23th. It passed south-east to Texas and then recurring took a north-easterly course to the middle Atlantic coast. It was not an area of much importance and did not disturb the weather in Canada.

WINDS.

In British Columbia the wind reached the force of a gale on two occasions, and the most prevalent winds were south-westerly. In the North-west Territories, the prevailing wind was westerly and there were two gales during the month, one of which was heavy. In Manitoba, northwesterly was the prevailing wind, and two

moderate gales occurred. There were no gales reported in the vicinity of Lake Superior, and the most prevalent winds were from the north west. In the Lower Lake District there were five gales, two of which attained the force of a strong gale; the most prevalent winds being from the east. Eight gales occurred in Quebec, of which three attained the force of a strong gale; both the easterly and westerly winds were most prevalent. There were three heavy and four moderate to fresh gales in the Maritime Provinces, whilst the greater number of winds came from the west. A brief description of each storm in eastern Canada where navigation remained open is as follows: A gale occurred on the 5th which in some instances reached the force of a heavy gale which was warned that morning, but in some instances the warning was late. On the 7th a strong gale occurred, the wind at Grand Manan reaching a velocity of 65 miles per hour. This was warned for the previous day. A moderate gale occurred locally on the Bay of Fundy at night on the 12th, which was warned for that morning. A strong gale with Grand Manan recording a velocity of 45 miles per hour was blowing on the night of the 15th and during the 16th which had been warned for on the morning of the 15th. All eastern stations were warned on the morning of the 18th for a strong gale and on the 19th and 20th a strong gale prevailed throughout the Maritime Provinces, a velocity of 54 miles being recorded at Grand Manan. There was a moderate gale locally in the Maritime Provinces on the night of the 23rd which had been warned for the previous night. A warning was sent on the night of the 28th for a strong gale to all eastern stations and on the 29th and 30th a heavy gale prevailed.

BRIGHT SUNSHINE.

The amount of bright sunshine was slightly above the average in the lower mainland of British Columbia and slightly below in the upper mainland. In the North-west and Manitoba it was generally above to a slight amount excepting near Battleford where it was slightly below. Everywhere else east of Manitoba it was slightly below.

TEMPERATURE.

Charlottetown reports temperature one degree above average and Quebec, Father Point, Halifax and Victoria, B. C., just average. At a few places in southern Ontario the average was also maintained but the temperature was much below over the greater portion of the Dominion, and the deficiency was strikingly remarkable in southern Alberta and Assiniboia where it amounted to between 15 and 20 degrees. This part of Canada also gave the largest amounts below average in February.

The Highest and Lowest Temperature in each Province during March, 1899, were:

British Columbia,	68.0 on 26th at Agassiz.	—34.0 on 1st at Atlin Lake.
North west Territories,	51.0 on 6th at Calgary.	—37.0 on 3rd at Moose Jaw.
Manitoba,	41.0 on 9th Emerson.	—36.0 on 6th at Portage la Prairie.
Ontario,	65.0 on 11th at Welland.	—39.5 on 17th at White River.
Quebec,	48.0 on 12th at Brome.	—22.8 on 18th at Chicoutimi.
New Brunswick,	50.8 on 6th at Fredericton.	—21.0 on 14th at Dalhousie.
Nova Scotia,	56.2 on 20th at Truro.	—1.4 on 15th at Parrsboro.
Prince Edward Island,	51.0 on 17th at Hamilton.	—2.0 on 15 at Hamilton.

PRECIPITATION.

Precipitation was half an inch below average at Victoria, B.C., and between five and six inches below at Port Simpson and slightly below over the greater portion of British Columbia and Manitoba; locally somewhat below in Alberta, the Lake Superior Region and Cape Breton, and in all the remaining portions of Canada, above average, and largely so from the Lake Region to our Atlantic coast stations. Montreal exceeded the average by 5.2 inches; St. John, N.B., by 3.8 inches; and all Ontario by from 2 to 3 inches. In the northern portion of Ontario and over the Province of Quebec, as well as in northern New Brunswick precipitation was largely as snow and some very heavy falls occurred, particularly those on the 16th, 20th, 24th and 29th.

PRESSURE, TEMPERATURE, WIND AND PRECIPITATION AT STATIONS IN THE DOMINION OF CANADA, MARCH, 1939.

a. Barometer not reduced to sea level.

• Stations not furnished with Registering Thermometers.

DIRECTION OF WIND FROM VELOCITY OF WIND PRECIPITATION.

[illegible]

PRECIPITATION AT STATIONS REPORTING RAIN, SNOW AND WEATHER DURING
MARCH, 1899.

TEMPERATURE recorded at Selkirk, Yukon, during March, 1899.

Day	Maximum	Minimum	Range	Day	Maximum	Minimum	Range
1	14.0	34.0	20.0	17	27.0	6.0	21.0
2	15.0	36.0	21.0	18	34.0	18.0	16.0
3	15.0	35.0	20.0	19	27.0	18.0	9.0
4	17.0	45.0	28.0	20	27.0	2.0	25.0
5	15.0	43.0	28.0	21	21.0	2.0	19.0
6	9.0	37.0	28.0	22	19.0	2.0	17.0
7	3.0	39.0	36.0	23	20.0	2.0	18.0
8	19.0	25.0	6.0	24	20.0	23.0	3.0
9	8.0	26.0	18.0	25	11.0	20.0	9.0
10	5.0	20.0	15.0	26	3.0	19.0	16.0
11	9.0	9.0	0.0	27	13.0	15.0	2.0
12	19.0	18.0	1.0	28	21.0	1.0	20.0
13	10.0	3.0	7.0	29	28.0	11.0	17.0
14	20.0	10.0	10.0	30	23.0	9.0	14.0
15	18.0	1.0	17.0	31	30.0	15.0	15.0
16	15.0	15.0	0.0				

Monthly mean

31.2

Highest

34.0 on 18th.

Lowest

- 36.0 on 2nd and 3rd.

Mean daily range

23.2.

Thunderstorms reported at—

5. Yarmouth, Port Dover, Moncton, Wolfville, Hamilton, P.E.I., Summerside, St. John.
6. Yarmouth, Parrsboro, Summerside.
7. Bermuda.
8. Parrsboro.
10. Bruce Mines.
11. Thompson, Agincourt.
12. Richmond, Brome.
14. Dutton, Princeton.
15. Welland, Lucknow, Hamilton, Brantford, Ridgetown, St. Ann's, Stratford, Durham, Port Stanley, Wyoming, Coldstream, Lansdowne, Dealtown, Dutton, Scarborough, St. George, Niagara, Stony Creek, Birnam, Port Dover.
16. Sunshine, St. Ann's.
20. Yarmouth, Eganville.
21. Niagara.
22. Stratford, Guvenerhurst, Durham, Coldwater, Guelph, London, Port Stanley, Georgetown, Aurora, Coldstream, Dealtown, Scarborough, Princeton, Wilton Grove, St. George, Stony Creek, Birnam, Point Clark, Collingwood, Lucknow, Erasmus, Port Hope, Hamilton, Brantford, Pickering, Ridgetown, Barrie, Sarnia.
24. Bermuda.
29. Bermuda.

Aurora recorded—

Where the class of aurora is noted by the observer, it is given (I) being the best, (IV) the feeblest in brilliancy

1. Cape Chatte, III; Pembina Crossing, IV.
2. Russell, IV; Channel Island, IV; Quebec, III; Perce, IV; Hillview, III; Aweme, II; Treherne.
- Red Deer, IV; Muscowpetung, I. Moose Jaw.
3. Russell, IV; Channel Island, IV; Minnedosa, IV; Cockburn Island, Savanna; Pembina Crossing, III; Regina, III; Assiniboia, IV.
4. Atlin Lake.
6. Channel Island, IV; Father Point, II; Quebec, IV. Savanna; Cape Chatte, IV; Red Deer, IV.

7. Port Arthur, II. : Calvin, Treherne.
8. Channel Island, IV. : Beatrice, IV.
9. Channel Island, IV. : Quebec, IV. : Savanne, Pembina Crossing, IV. : Regina, III.
10. Fredericton, IV. : Russell, II. : Truro, IV. : Channel Island, IV. : Prince Albert, I. : Father Point, III. : Quebec, IV. : Peree, III. : Chicoutimi, Aweme, III. : Cunnington Manor, II. : Pictou : Regina, I.
11. Russell, II. : Channel Island, IV. : Battleford, IV. : Chicoutimi, Pembina Crossing, III. : Belmont Hillview, IV. : Aweme, Portage la Prairie, III. : Treherne, Cunnington Manor, IV.
12. Minnedosa, Belmont, Aweme, IV. : Cunnington Manor, IV. : Red Deer, IV.
13. Cockburn Island, Savanne, Pembina Crossing, IV. : Aweme, IV. : Treherne, Duck Lake, IV.
14. Russell, II. : Channel Island, IV. : Battleford, IV. : Quebec, IV. : Cape Chatte, I. : Pembina Crossing, IV. : Hillview, III. : Duck Lake, II. : Red Deer, IV.
15. Russell, III. : Channel Island, IV. : Prince Albert, II. : Savanne, Pembina Crossing, III. : Hillview, IV. : Portage la Prairie, II. : Treherne.
16. Russell, IV. : Channel Island, IV. : Battleford, IV. : Savanne, Pembina Crossing, IV.
17. Battleford, IV.
18. Regina, IV.
21. Fredericton, IV. : Emerson Russell, II. : Channel Island, III. : Banff, III. : Minnedosa, II. : Quebec, IV. : W. Beaver Hills, Quesnelle Forks, *unusually bright*, Moncton, Sussex, Chicoutimi : Pembina Crossing, I, *rose coloured*, Belmont, Aweme, III. : Treherne, Cunnington Manor, III. : Red Deer, I, *very brilliant* : Muscowpetung, I.
- I. Moose Jaw : Regina, II. : Atlin Lake.
22. St. John, I. : Regina, II.
23. Savanne.
24. Treherne.
28. Russell, IV. : Hillview, IV.
29. Muscowpetung, III. : Moose Jaw : Regina, III.
30. Regina, IV.
31. Russell, IV. : Truro, IV. : Hillview, III. : Red Deer, II.

Appearance of spring birds, &c.

Crows.—Spence's Bridge, 5th : Gravenhurst, 2nd : Stony Mountain, 30th : Midland, 6th : Ursa, 10th : Thompson, 15th : Sunshine, 2nd : Richmond, 1st : Clontarf, 6th : Calvin, 7th : Barrie, 1st : Emo, 26th : Meaford, 12 : Lakefield, 10th : Erasmus, 7th : Whiteside, 12th : Owen Sound, 4th : Orillia, 11th : Beatrice, 14th : Point Clark, 8th : Stony Creek, 12th : Haliburton, 11th : Bancroft, 15th : Midway, 30th.

Cedar War Wings.—Toronto, March 1st.

Robins.—Kuper Island, 6th : Chilliwack, 14th : Spence's Bridge, 6th : Stratford, 15th : London, 12th : Port Stanley, 12th : Wooler, 27th : Scarborough, 31st : Beaver Creek, 6th : Clontarf, 25th : Ridgetown, 14th : Stouffville, 16th : Meaford, 30th : Brantford, 20th : Lakefield, 14th : Owen Sound, 2nd : Paris, 12th : Birnam, 1st : Stony Creek, 12th : Bancroft, 25th : St. George, 20th : North Nicomen, 12th : Hazlemere, 6th : Toronto, 13th.

Blue Birds.—Spence's Bridge, 11th : Port Stanley, 12th : Toronto, 24th.

Owl.—Whiteside, 11th.

Black Birds.—Birnam, 14th.

Phoebe.—Lakefield, 6th.

Meafow Lark.—Spence's Bridge, 2nd : St. Stephen, 23rd.

Geese.—Stouffville, 1st.

Frogs Piping.—Kuper Island, 6th : Chilliwack, 14th : Beaver Creek 6th.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE THE HORIZON IN THE MONTH OF MARCH, 1889.

	HOURS ENDING.															
	5 a.m.	6 a.m.	7 a.m.	8 a.m.	9 a.m.	10 a.m.	11 a.m.	Noon.	1 p.m.	2 p.m.	3 p.m.	4 p.m.	5 p.m.	6 p.m.	7 p.m.	8 p.m.
Esquimaux			0.09	0.24	0.32	0.42	0.42	0.35	0.50	0.57	0.55	0.55	0.39	0.18		
Kuper Island			0.01	0.26	0.37	0.42	0.40	0.44	0.56	0.59	0.57	0.61	0.59	0.29		
Agassiz, B.C.			0.00	0.04	0.19	0.25	0.32	0.37	0.36	0.41	0.34	0.34	0.15	0.02		
Battleford			0.39	0.56	0.56	0.60	0.60	0.56	0.58	0.54	0.49	0.43	0.22	0.02		
Indian Head			0.00	0.13	0.37	0.44	0.52	0.59	0.54	0.55	0.59	0.51	0.21	0.02		
Brandon			0.16	0.46	0.52	0.60	0.65	0.63	0.64	0.66	0.56	0.55	0.49	0.15		
Winnipeg			0.11	0.40	0.65	0.71	0.75	0.74	0.66	0.65	0.63	0.61	0.49	0.11		
Durham			0.14	0.26	0.32	0.37	0.39	0.35	0.34	0.31	0.30	0.30	0.19	0.05		
Woodstock			0.00	0.19	0.35	0.32	0.34	0.36	0.26	0.26	0.24	0.16	0.09	0.01		
Toronto			0.02	0.27	0.45	0.49	0.47	0.39	0.42	0.41	0.38	0.37	0.26	0.17	0.03	
Lindsay			0.09	0.33	0.49	0.55	0.55	0.51	0.42	0.42	0.45	0.34	0.25	0.20	0.04	
Barrie			0.04	0.26	0.48	0.50	0.58	0.54	0.48	0.46	0.38	0.34	0.25	0.07		
Kingston			0.14	0.15	0.49	0.49	0.50	0.57	0.51	0.51	0.48	0.40	0.28	0.04		
Ottawa			0.06	0.27	0.36	0.45	0.47	0.50	0.47	0.39	0.37	0.31	0.29	0.08		
Montreal			0.07	0.23	0.30	0.46	0.44	0.50	0.51	0.51	0.43	0.38	0.27	0.01		
Fredricton		0.15	0.33	0.38	0.41	0.46	0.48	0.52	0.48	0.43	0.43	0.35	0.16	0.00		
	Esquimaux.	Kuper Island.	Agassiz.	Battleford.	Indian Head.	Brandon.	Winnipeg.	Durham.	Woodstock.	Toronto.	Lindsay.	Barrie.	Kingston.	Ottawa.	Montreal.	Fredricton.
Mean proportion for month (Constant situation being 1.)	0.38	0.43	0.23	0.47	0.37	0.51	0.55	0.28	0.42	0.35	0.39	0.37	0.39	0.33	0.39	0.38
Difference from average	+ .03	-.05	-.04	+.03	-.07	+.04			-.11	-.08	-.06	-.06	-.06	-.08	-.03	
Maximum daily amount	0.95	0.89	0.71	0.94	0.85	0.91	0.88	0.80	0.86	0.91	0.90	0.86	0.85	0.86	0.99	0.87
Dates	18	15	16	4	17	11	11	14	1	26	7	26	1	6	1	6
No. of days completely clouded	3	5	10	2	8	5	5	15	11	7	9	7	9	11	12	8

MARCH FORECASTS.

The forecasts issued by this office at 11 p.m. each night are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 906. These were divided as follows:—

District.	No. Issued.	Verified.			Percentage
		No. Fully	No. Partly	No. Not	
Manitoba.....	87	51	19	17	69.5
Lake Superior.....	89	63	26	6	82.0
Lower Lake Region.....	108	69	27	12	76.4
Georgian Bay.....	103	67	17	19	73.3
Ottawa Valley.....	102	71	13	18	76.6
Upper St. Lawrence.....	102	69	19	14	76.9
Lower St. Lawrence.....	97	62	20	15	74.2
Gulf.....	98	73	9	16	79.1
Maritime Provinces.....	129	74	34	12	75.8
Total.....	906	599	178	129	75.9

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by two and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent predictions have been verified, the reports from the agents at all observing stations, as well as the telegraphic reports, are used.

The storm warnings and forecasts for March were issued by Forecast Official H. V. Payne.

HAS THE CLIMATE CHANGED?

(F. F. PAYNE.)

A question very frequently asked of the meteorological observer is whether the climate is not changing, or rather, whether it has not changed in the last fifty or sixty years, and the questioner will usually add that in his opinion great changes have taken place. In support of his assertion he will point especially to the drying up of streams which before the land was denuded of trees would float rafts or boats throughout the summer. He will also point to the same period when there was plenty of snow and good sleighing throughout the winter in Ontario and speak of the "Good old fashioned winters of long ago," believing that if there was plenty of snow there could not have been the high temperature experienced at the present time. There are others, and they are mostly to be found in Manitoba and the North-west Territories, who, on the contrary, believe the winters are colder than they used to be. The most remarkable thing about these people is the change that often takes place in their belief if an abnormal winter occurs; and should two such winters occur in succession their beliefs are often completely reversed.

Whilst our insufficient data will not allow us to assert definitely that there has been no change in the climate of the districts mentioned, or in fact in any other part of Canada during the present century, we may state that our meteorological records covering many years show no such change.

The cause of this popular belief regarding the climate is probably owing largely to the change of environment and defective memory, those going from southern Ontario westward to the prairie lands of Manitoba and the Territories, forgetting, after many years, the conditions during the first few years residence in the latter district, and confounding in their minds the climates of the two localities. Undoubtedly since the denudation of the land of the trees upon it many streams have completely disappeared, but this is most probably owing to the rain water, formerly held entangled in the vegetation and entering the streams slowly, now making its way to the river beds as quickly as it falls. This sudden swelling of the waters is the cause of frequent floods which were unknown before forests disappeared. Going back as far as our data will take us there is no perceptible change in the total snowfall in Ontario, but where it is not sheltered by trees the depth is quickly reduced by bright sunshine in the open country, even in exceedingly cold weather, whilst in wooded districts it remains practically unchanged.



METEOROLOGICAL SERVICE, DOMINION OF CANADA.

Monthly Weather Review.

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No. 4

INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather forecasting, and reports by mail from voluntary observers and storm signal agents. For the material used in tracing the paths of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

REMARKS ON THE WEATHER.

The weather of April, though unusually cold during the first few days, did not depart much from normal; the precipitation, however, was deficient throughout the greater part of the country; and whilst in western Canada the mean temperature was generally below average, in the eastern portion of the Dominion it was above. Owing, doubtless, to the exceptionally backward condition of vegetation on the last day of March there was not the usual progress in April, and on the 30th it was still very backward in most districts.

In British Columbia the weather was for the most part fine and cool, the mean temperature being below average. The rainfall, though light in some places, did not differ much from normal and in a few districts it was above average. Frosts at night occurred frequently during the first week in most places, and they were also recorded later in the month at some stations. Vegetation throughout the province was somewhat backward on the 30th.

In the North-west Territories the weather was exceptionally cold during the first few days of the month, the temperature falling to from -10 to -20 on the 1st and 2nd in Saskatchewan and Assiniboia. On the 5th it moderated and continued mild to the 26th, and although the nights were often cold the day temperatures were comparatively high. On the 26th it again turned colder, snow falling in most districts a day or so later. Although there was much bright sunshine vegetation was backward and warm rains were much needed.

The weather in Manitoba though not so cool as in the Territories was cooler than usual; there was however much bright sunshine, and after the 5th it was more springlike. The precipitation though rather above average at Winnipeg and St. Albans was generally below elsewhere. Vegetation was backward throughout the province but was not so much so as in the Territories.

In the Province of Ontario the weather was cool and unpleasant up to the 11th, after which it became mild and spring like and continued so to the end of the month. In districts bordering on Lake Huron the precipitation was rather greater than usual, elsewhere however it was below average; and vegetation, which was backward, was much in need of warm rain. In districts contiguous to the Georgian Bay there was enough snow for sleighing on the 13th, and in some places even six days later. Thunder storms occurred at most stations and at Point Clarke and Toronto five were recorded.

The weather in the Province of Quebec was exceptionally fine, mild and dry, the temperature being above average and the precipitation below. During the first ten days it was cool but fine mild weather succeeded this, and the snow which in some places was several feet in depth was quickly melted. The lowest temperatures occurred generally on or about the 5th and the highest about the 30th. Frosts were recorded upon several occasions and in some cases they were severe. Vegetation though somewhat backward made good progress towards the end of the month.

The weather conditions in New Brunswick were much the same as in Quebec the temperature being above average and the precipitation below: it was, however, finer, more especially towards the end of the month. Frosts occurred frequently at night and although the days were mild vegetation was doubtless retarded in some districts in consequence. About the 29th the weather turned unusually warm, temperatures from 75 to 83 being recorded.

In Nova Scotia the weather conditions took much the same character as in the two last named provinces, it being for the most part fine, mild and dry; the extremes of temperature, however, were not quite so great and clouded skies were more frequent. Frosts occurred frequently throughout the month and plant life was rather backward on the last day.

The weather in Prince Edward Island was generally fair and mild and the precipitation in most districts was light; night frosts however were of frequent occurrence and vegetation was somewhat backward in consequence. The highest temperatures occurred on or about the 29th and the lowest on the 7th. F. F. PAYNE.

HIGH AREAS.

Five high pressure areas were sufficiently well marked to be traced but none of them were very energetic.

No. 1 was centered in the North-west Territories on the morning of the 1st, attended by very cold weather, Qu'Appelle reporting -24°. The area spread quickly over Canada to the Atlantic accompanied by cold weather, but the main body of the system did not leave the North-west Territories and Manitoba until the evening of the 3rd, when it moved southeastward to the Lake Region and passed on the 6th off the New England Coast. No. 2 travelled over the North Pacific States on the 6th and reached the States bordering on the Gulf of Mexico on the 9th. It then, between the 9th and 11th, spread northeastward into Canada from the Lower Lakes to the Atlantic attended by very fine weather. No. 3 was situated in the North Pacific States on the 13th. On the 15th it had reached Dakota; thence it moved to the South Atlantic States where it was centred on the morning of the 17th. From the South Atlantic States its centre was transferred to the Lower St. Lawrence Valley and on the 19th, and for several days afterwards high pressure and fine weather prevailed from the lakes to the Atlantic. No. 4 moved into the North Pacific States on the 19th, thence slowly over the Lake Region to the St. Lawrence Valley and broke up. It was of moderate energy only. No. 5 moved into the Lower St. Lawrence Valley on the 26th from the northward and thence passed slowly southward to the Middle Atlantic Coast. It was of little energy, but it was accompanied by a spell of very fine weather in the Maritime Provinces.

LOW AREAS.

Ten areas of low pressure were sufficiently well marked to be charted and there were one or two other depressions of minor importance whose tracks were too doubtful to be accurately ascertained.

No. 1 appeared in the vicinity of New Mexico on the 2nd, and passed over the Southern States and thence off the Carolina Coast and to the northward of Bermuda. It did not affect the weather in Canada. No. 2 first became well defined on the 5th when on the Texas Coast. It travelled northeastward as a depression of importance, reached the St. Lawrence Valley during the night of the 8th, whence it passed to the Straits of Belle Isle. Between the 7th and 9th it brought heavy precipitation from the lakes to the Atlantic which in the northern portions of Ontario and over the greater portion of Quebec was largely as snow; moderate gales were also generally experienced. No. 3 was situated over Alberta on the morning of the 9th and between the 9th and 11th passed over the Territories and Manitoba and thence north of Lake Superior. It was attended by a few scattered showers only in the North-west but owing to its influence showers and thunderstorms were generally experienced in the Lake Region on the 11th, and in the Ottawa and St. Lawrence Valleys on the 12th. No. 4 passed over Cape Breton during the night of the 12th having moved in from the Atlantic. It caused a fall of rain west as far as Halifax. No. 5 passed into Alberta from British Columbia during the night of the 11th. Between the 12th and 14th it traversed the Territories, Manitoba and the Lake Region and dispersed in the Lower St. Lawrence Valley. It was attended by local falls of rain and snow in the North-west and by numerous showers and thunderstorms in Ontario and Quebec. No. 6 formed during the night of the 15th in the Middle Atlantic States in an existing low pressure trough. On the 17th it passed along the Nova Scotia Coast as a disturbance of considerable energy attended in the Maritime Province by heavy rains and fresh northeasterly to northerly gales. No. 7 passed southeastward over British Columbia on the 15th skirting Southern Alberta on the 16th. On the 17th it covered the North-west States. On the 18th it reached Lake Superior and on the 19th dispersed. It caused light snowfalls in the North-west and showers in Ontario, as a rule light. No. 8 formed on the 19th in the Western States. Its ultimate course is doubtful, but the area was noticeable for the fall of snow which it occasioned in Manitoba on the 19th and 20th. No. 9 was a depression of considerable importance when over the northwestern portion of the continent between the 25th and 27th, the barometer reduced to sea level falling to 28.80 inches. The area however did not extend further east than Lake Superior and it seemingly passed to Hudson Bay. During its presence in the North-west thunderstorms were experienced at first, followed by a change to decidedly colder weather and light snowfalls. A fall of rain also occurred over the Lake Superior Region. No. 10 was a marked depression on the morning of the 30th centered in Colorado, it having developed during the night. It travelled northeasterly and on May 1st dispersed over Lake Superior. Showers and thunderstorms were general in Ontario and Quebec on the 30th attendant apparently to a great extent on this area.

ATMOSPHERIC PRESSURE.

The mean atmospheric pressure was above the average from the Straits of Mackinaw east to our Atlantic Coast and below everywhere else. The greatest amount above average 0.10 of an inch occurred in southwestern New Brunswick, and the greatest amount below average was in the interior of British Columbia.

BRIGHT SUNSHINE.

Bright sunshine was above the average amount at all stations in Canada except at Fredericton, where it was just average. The two extreme portions of Canada gave the largest amount of bright sunshine, 14 per cent and Fredericton 10 per cent.

TEMPERATURE.

The mean temperature of the month was above average in the Dominion, everywhere east of a line from north and south through Winnipeg, and below average everywhere to the westward; the greatest excess was over the more central portions of Ontario, and the greatest departure below average was in Alberta, and the more western parts of Saskatchewan and Assiniboia. The temperature was decidedly below average for the first ten days in all districts between the Great Lakes and the Maritime Provinces, then abnormally high temperature became prevalent, and during the last few days summer-like conditions obtained. In the North-west Territories the month closed cold and disagreeable, and snow was reported in many localities. The following are the highest and lowest temperatures recorded in each province during April, 1899:—

British Columbia	83° 0 on 27th at Quesnelle.	6° 0 on 1st at Barkerville.
North-west Territories	74° 1 on 26th at Medicine Hat.	-24° 0 on 1st at Qu'Appelle.
Manitoba	81° 0 on 27th at Emerson.	12° 8 on 6th at Winnipeg.
Ontario	88° 0 on 30th at Paris and Cottam.	-11° 0 on 4th at White River.
Quebec	82° 0 on 30th at Montreal.	4° 0 on 5th at Brome.
New Brunswick	81° 7 on 30th at Fredericton.	11° 0 on 7th at Pallsburg.
Nova Scotia	81° 7 on 30th at Pictou.	16° 6 on 1st at Parrsboro.
Prince Edward Island	70° 6 on 28th at Charlottetown.	18° 5 on 7th at Hamilton.

PRECIPITATION.

The precipitation was less than average throughout the Dominion, except in Eastern Manitoba and north of Lake Superior, and perhaps on Vancouver Island. Rain was needed in South-western Ontario, and on the North-western prairie lands, but elsewhere the ground has been well watered by melting snow and thunder-showers.

WINDS.

In British Columbia the westerly winds were the most prevalent, and although for the most part they were fresh to strong, there were no gales recorded. One moderate and three strong gales occurred in the North-west, the most prevalent wind being also westerly. There were several strong winds in Manitoba, but only one moderate gale was recorded, and here also the greater number of winds were westerly. In Ontario winds were as a rule moderate, the force of a moderate gale being attained only once during the month and there were numerous variable winds and calms. The winds were about equally divided between the easterly and the westerly. In Quebec the westerly was the most prevalent wind and whilst they were often fresh, a moderate gale was only recorded twice. In the Maritime Provinces there was one fresh and one strong gale and the westerly were the most numerous winds. Warnings were sent out twice during the month to stations in the Maritime Provinces where navigation was open, on the 7th for a moderate gale, a moderate gale occurring on the 8th and 9th; and again on the 16th for a strong gale, a heavy gale prevailing on the 17th and 18th.

N.-W. TERRITORIES—*Con.*

N.-W. TERRITORIES— <i>Con.</i>																				
Indian Head	50	35	104	97	1084	4	2	10	16	5.5	14	23	0	90	1.15	4.40	0.75	3.35	7.1	0
Camden	49	38	103	40	1034	1	1	1	1	1	1	1	1	1	0.80	0.55	0.30	0.85	0	0
Camden Major	49	43	102	7	1034	1	1	1	1	1	1	1	1	1	0.61	1.13	0.57	4.56	6.1	1
Madison	49	43	113	24	1034	1	1	1	1	1	1	1	1	1	0.76	0.68	0.26	0.53	0	1
Madison	49	43	113	24	1034	1	1	1	1	1	1	1	1	1	0.76	0.68	0.26	0.53	0	1
Gatesmouth	49	50	105	42	1034	1	1	1	1	1	1	1	1	1	1.15	0.29	0.57	4.26	1	0
Pincher Creek	49	50	113	54	1034	1	1	1	1	1	1	1	1	1	1.15	0.29	0.57	4.26	1	0
Pincher Creek	49	50	113	54	1034	1	1	1	1	1	1	1	1	1	1.15	0.29	0.57	4.26	1	0
Gravelly	49	52	102	53	1034	1	1	1	1	1	1	1	1	1	1.15	0.29	0.57	4.26	1	0
Gravelly	49	52	102	53	1034	1	1	1	1	1	1	1	1	1	1.15	0.29	0.57	4.26	1	0
Fort Simpson	50	13	104	43	1034	1	1	1	1	1	1	1	1	1	1.49	—	0.50	1.15	0	0
Fort Simpson	50	13	104	43	1034	1	1	1	1	1	1	1	1	1	1.49	—	0.50	1.15	0	0
Alameda	49	13	117	17	1034	1	1	1	1	1	1	1	1	1	0.60	—	0.56	4.56	0	0
Alameda	49	13	117	17	1034	1	1	1	1	1	1	1	1	1	0.60	—	0.56	4.56	0	0
Tuesli (Yukon)	50	13	117	17	1034	1	1	1	1	1	1	1	1	1	0.60	—	0.56	4.56	0	0
Tuesli (Yukon)	50	13	117	17	1034	1	1	1	1	1	1	1	1	1	0.60	—	0.56	4.56	0	0
Red Deer	50	13	113	30	1034	1	1	1	1	1	1	1	1	1	1.00	—	0.56	6.20	6	0
Red Deer	50	13	113	30	1034	1	1	1	1	1	1	1	1	1	1.00	—	0.56	6.20	6	0
Saskatoon	50	13	113	30	1034	1	1	1	1	1	1	1	1	1	1.00	—	0.56	6.20	6	0
Saskatoon	50	13	113	30	1034	1	1	1	1	1	1	1	1	1	1.00	—	0.56	6.20	6	0
Saskatoon	50	13	113	30	1034	1	1	1	1	1	1	1	1	1	1.00	—	0.56	6.20	6	0
Saskatoon	50	13	113	30	1034	1	1	1	1	1	1	1	1	1	1.00	—	0.56	6.20	6	0
Saskatoon	50	13	113	30	1034	1	1	1	1	1	1	1	1	1	1.00	—	0.56	6.20	6	0
Saskatoon	50	13	113	30	1034	1	1	1	1	1	1	1	1	1	1.00	—	0.56	6.20	6	0
Saskatoon	50	13	113	30	1034	1	1	1	1	1	1	1	1	1	1.00	—	0.56	6.20	6	0
Saskatoon	50	13	113	30	1034	1	1	1	1	1	1	1	1	1	1.00	—	0.56	6.20	6	0
Saskatoon	50	13	113	30	1034	1	1	1	1	1	1	1	1	1	1.00	—	0.56	6.20	6	0
Saskatoon	50	13	113	30	1034	1	1	1	1	1	1	1	1	1	1.00	—	0.56	6.20	6	0
Saskatoon	50	13	113	30	1034	1	1	1	1	1	1	1	1	1	1.00	—	0.56	6.20	6	0
Saskatoon	50	13	113	30	1034	1	1	1	1	1	1	1	1	1	1.00	—	0.56	6.20	6	0
Saskatoon	50	13	113	30	1034	1	1	1	1	1	1	1	1	1	1.00	—	0.56	6.20	6	0
Saskatoon	50	13	113	30	1034	1	1	1	1	1	1	1	1	1	1.00	—	0.56	6.20	6	0
Saskatoon	50	13	113	30	1034	1	1	1	1	1	1	1	1	1	1.00	—	0.56	6.20	6	0
Saskatoon	50	13	113	30	1034	1	1	1	1	1	1	1	1	1	1.00	—	0.56	6.20	6	0
Saskatoon	50	13	113	30	1034	1	1	1	1	1	1	1	1	1	1.00	—	0.56	6.20	6	0
Saskatoon	50	13	113	30	1034	1	1	1	1	1	1	1	1	1	1.00	—	0.56	6.20	6	0
Saskatoon	50	13	113	30	1034	1	1	1	1	1	1	1	1	1	1.00	—	0.56	6.20	6	0
Saskatoon	50	13	113	30	1034	1	1	1	1	1	1	1	1	1	1.00	—	0.56	6.20	6	0
Saskatoon	50	13	113	30	1034	1	1	1	1	1	1	1	1	1	1.00	—	0.56	6.20	6	0
Saskatoon	50	13	113	30	1034	1	1	1	1	1	1	1	1	1	1.00	—	0.56	6.20	6	0
Saskatoon	50	13	113	30	1034	1	1	1	1	1	1	1	1	1	1.00	—	0.56	6.20	6	0
Saskatoon	50	13	113	30	1034	1	1	1	1	1	1	1	1	1	1.00	—	0.56	6.20	6	0
Saskatoon	50	13	113	30	1034	1	1	1	1	1	1	1	1	1	1.00	—	0.56	6.20	6	0
Saskatoon	50	13	113	30	1034	1	1	1	1	1	1	1	1	1	1.00	—	0.56	6.20	6	0
Saskatoon	50	13	113	30	1034	1	1	1	1	1	1	1	1	1	1.00	—	0.56	6.20	6	0
Saskatoon	50	13	113	30	1034	1	1	1	1	1	1	1	1	1	1.00	—	0.56	6.20	6	0
Saskatoon	50	13	113	30	1034	1	1	1	1	1	1	1	1	1	1.00	—	0.56	6.20	6	0
Saskatoon	50	13	113	30	1034	1	1	1	1	1	1	1	1	1	1.00	—	0.56	6.20	6	0
Saskatoon	50	13	113	30	1034	1	1	1	1	1	1	1	1	1	1.00	—	0.56	6.20	6	0
Saskatoon	50	13	113	30	1034	1	1	1	1	1	1	1	1	1	1.00	—	0.56	6.		

Only

OBSERVATIONS AT STATIONS REPORTING RAIN, SNOW AND WEATHER, DURING
APRIL, 1899.

STATIONS	RAINFALL.					SNOWEALL.				THUNDER OR LIGHTNING.	REMARKS.
	Amount in inches.	Days of or Over.	No. of Rain Days.	Highest Fall in Month.	Date.	Amount in inches.	No. of Days.	Highest Fall in Month.	Date.		
BRITISH COLUMBIA											
Cumberland	2.75	8	22	1.50	15-16						
Beaver Creek	4.56	16	14	0.95	21		4				
Langley	4.33	13	17	0.83	11					30	
Nanaimo	1.72	4	26	0.81	11						
Goldstream Lake	5.95	16	14	2.94	11						
Royal Oak	3.22	15	15	1.38	11						
Salt Spring Island	1.54	7	23	0.54	12						
Valder Island	3.76	14	14	1.10	19						
N. W. TERRITORIES											
Courts	0.21	1	26	0.21	18	4.0	3	4.0	30		Blizzard on 30th
Imperial	0.13	2	27	0.07	21	3.0	4	2.0	21		Blizzard on 30th
Dudbury			28			1.4	2	1.1	21		Blizzard on 30th
West Beaver Hills	0.52	5	19	0.24	26	7.4	7	3.8	30		
Salcoats	0.01	1	28	0.01	26	0.5	2	0.5	4		
MANTOYA											
Solihik	1.25	2	25	0.65	23	3.0	3	3.0	19	23, 26	River clear of ice,
Pembina Crossing	0.30	1	22	0.30	26	13.0	6	11.0	20	23, 26	22nd
Rapid City	0.50	1	27	0.50	27	2.0	2	1.0	5-21	26	
Gretina	0.91	5	18	0.48	19	3.3	6	2.0	17	23, 24, 26	
Morhan	0.11	3	20	0.05	19	10.0	7	7.0	20-21	24, 26	
Hartney	0.25	1	25	0.25	26	5.0	2	1.0	20		
Belmont	0.87	5	24	0.51	26	7.0	2	7.0	20	26	
Shed Lake							2				
Carwaght	1.80	4	25	0.52	12	9.0	4	7.0	19	26	
Chadbank	1.61	7	24	0.64	26	8.0	7	4.0	4	26	
Carwaght #2	2.35	3	24	1.72	26		3				
Greenwood	0.41	1	28	0.41	26	6.6	1	6.0	20		
Beaver Creek	1.64	3		1.01	26						
Edgem	0.42	4	24	0.19	26	4.0	1	3.5	26	26	
Deloraine	0.53	2	24	0.30	26	3.5	5	2.0	19	26	
Norway	1.11	3	24	0.54	24	11.0	5	6.0	20	24, 26	
Turtle Mountain	0.45	3	26	0.25	13	12.0	3	12.0	19-20	26	
ONTARIO—											
Midland.....	1.52	8	19	0.50	30	*	3			13, 30	
Ursa	0.97	5	24	0.32	14	3.0	2	2.0	7		
Cherry Valley	0.94	1	25	0.31	22	1.0	2	0.5	2	30	
Croydon	0.95	2	27	0.83	8	0.5	1	0.5	9	29	
Providence Bay	1.18	6	24	0.36	14	4.0	2	2.0	8	11, 22, 29, 30	
Emmetsburg	0.94	5	23	0.25	14	1.0	2	2.0	8		
Warton	1.77	4	23	0.61	30	3.0	3	3.0	2	11, 13, 14, 30	
Princeton	0.60	1	29	0.60	11					11	
Lion's Head	1.68	6	24	0.46	18					13, 14, 30	
Kitley	1.27	2	27	1.00	8	*	3			12	
Oliver's Ferry	0.45	3	27	0.15	8						
Thompson	3.86	4	26	1.15	14					14	
Deer Park	1.57	5	24	0.72	12	1.5	2	1.0	16		
Huntsville	0.55	3	26	0.27	19	0.5	1	0.5	5		
Colketown	0.92	4	26	0.51	11					11	
Watford	1.21	4	26	0.43	29						
Orangeville	1.76	6	23	0.84	11	4.5	2	3.5	16	11, 13, 14	
Fort Burwell	0.52	7	23	0.26	9	*	1				
Montague	0.30	2	28	0.30	8						
Elgin	1.29	3	27	0.92	7						
Lansdowne	1.18	3	25	1.08	8-9	0.5	4	0.5	8		
Jersey	0.86	3	24	0.50	8	*	1			13, 14	
Windsor	1.17	7	24	0.47	8	*	4			13, 30	
Parnia	1.07	4	26	0.81	8	1.5	1	1.5	9		
Wyoming	1.07	1	25	0.40	11						
Wilton Grove	0.51	6	23	0.28	11	*	1			11, 30	
Lambsch	0.76	6	24	0.27	7						
Sunshine	1.55	6	24	0.96	12	5.5	3	2.5	16	11, 24, 26	
Roblin's Mills	0.65	3	25	0.45	7						
Amora	1.22	6	23	0.50	11	2.8	2	2.0	15	13, 30	
Scarbrough	0.38	10	16	0.66	11		5			11, 13, 14, 21, 25, 30	
Dutton	0.38	4	25	0.16	11	*	1			22, 30	
Georgetown	1.31	8	14	0.91	11	2.7	4	2.7	16	11, 14, 30	
Ensley	0.76	6	23	0.28	19	0.5	1	0.5	8	14, 30	
Goderich	0.54	2	28	0.50	19						
Arden	0.72	4	26	0.59	8	1.0	1	1.0	8	14	
Dealtown	0.22	3	25	0.16	7		2				
NEW BRUNSWICK											
Point Esquimaux	0.11	1	25	0.11	17	0.7	4	0.5	13		
NOVA SCOTIA											
Port Morden	2.31	5	25	0.84	12						
P. E. ISLAND											
Mount Stewart	2.07	3	27	0.93	17						
Port Hill	0.22	2	27	0.22	17	3.0	3	1.5	12		
Murray River	2.86	5	25	0.75	8						

Thunder recorded on:—

1. Bermuda.
3. Quesnelle Forks.
5. Bermuda.
10. Regina.
11. Coldstream, Orangeville, Wilton Grove, Sunshine, Scarboro, Stony Creek, Paris, Point Clark, St. George, Welland, Erasmus, Hamilton, Sarnia, St. Ann's, Agincourt, Birnam, Lucknow, Niagara, Brantford, Providence Bay, Warton, Princeton, Guelph, London, Stratford, Battleford, St. Mary's.
12. Dalhousie Mills, Otonabee, Kitley, Savanne, Brome.
13. Paris, Point Clark, Whiteside, Erasmus, Lakefield, Bruce Mines, Agincourt, Peterborough, Meaford, Lucknow, Haliburton, Niagara, Stouffville, Brome, Midland, Warton, Lion's Head, Orangeville, Jernyn, Wooler, Aurora, Scarboro, Coldwater, Gravenhurst, Durham, Lindsay, Saugeen, Haileybury, Barrie.
14. Point Clark, Whiteside, Cockburn Island, Lakefield, Hamilton, Bruce Mines, Beatrice, Bancroft, Uplands, St. Ann's, Peterborough, Meaford, Lucknow, Haliburton, Brantford, Lion's Head, Midland, Warton, Orangeville, Jernyn, Wilton Grove, Scarboro, Arden, Coldwater, London, Gravenhurst, Durham, Lindsay, White River, Parry Sound, Saugeen, Port Stanley, Haileybury, Barrie.
16. Bognor, Bermuda.
19. Red Deer.
21. Cockburn Island, N. Nicomen, Victoria.
22. Providence Bay.
23. Selkirk, Pembina Crossing, Aweme, Emerson.
24. Stony Creek, Erasmus, Sunshine, Scarboro, Portage la Prairie, Rosebank, Gretna, Morden, Norquay, Guelph, Winnipeg.
25. Scarboro, Collingwood, Barnardo, Emerson, Lindsay, Port Arthur.
26. Norquay, Coldwater, Elgin, Collingwood, Winnipeg, Cannington Manor, Point Clark, Sunshine, Portage la Prairie, Rosebank, Brandon, Selkirk, Pembina Crossing, Rapid City, Gretna, Morden, Hillview, Belmont, Cartwright, Oakbank, Turtle Mountain.
27. Port Arthur, White River.
28. Cottam, Ridgetown, Birnam, Lucknow.
29. Abbotsford *heaviest hail for 10 years*, Cockburn Island, Erasmus, Bruce Mines, Agincourt, Croydon, Providence Bay, Aweme, White River.
30. Langley, Paris, Point Clark, Owen Sound, Windsor, Cockburn Island, Erasmus, Otonabee, Agincourt, Port Hope, Sprucedale, Meaford, Birnam, Lucknow, Niagara, Dalhousie Mills, Hamilton, Bruce Mines, Collingwood, Beatrice, Bancroft, Uplands, Stouffville, Midland, Cherry Valley, Ennismore, Warton, Lion's Head, Thompson, Wooler, Wilton Grove, Aurora, Emsdale, Chatham, Collingwood, Montreal, Woodstock, Saugeen, Coldwater, Gravenhurst, London, Durham, Lindsay, Stratford, Bermuda, Parry Sound, Port Stanley, Quebec, Haileybury, St. Mary's, Barrie.

Aurora recorded—

Where the class of aurora is noted by the observer, it is given, (I) being the brightest, (IV) the feeblest in brilliancy.

1. Pembina Crossing, III; Cannington Manor, IV; Savanne, Regina, II.
2. Hillview, IV; Duck Lake, III; Cannington Manor, IV; Red Deer, IV; Savanne, Regina, IV; Haileybury, IV.
3. Pembina Crossing, III; Hillview, IV; Beatrice, IV; Regina, II; Quebec, IV; Haileybury, II; Oonikup.
4. Georgetown, IV; Chicoutimi, Cockburn Island, Erasmus, W. Beaver Hills, IV; Gatesgarth, Red Deer, IV; Regina, III; Barnardo, II; Coldwater, II; Quebec, IV; Haileybury, IV; Oonikup.
5. Cannington Manor, IV; Qu'Appelle, Father Point, IV; Haileybury, IV.
6. Aweme, IV; Pembina Crossing, III; Hillview, I; Cockburn Island, W. Beaver Hills, IV; Red Deer, IV; Cape Magdalen, Savanne, Regina, III; Truro, IV; Qu'Appelle, Quebec, IV; Father Point, IV.
7. Pembina Crossing, III; Duck Lake, Savanne, Regina, IV; Truro, IV; Qu'Appelle, Swift Current IV; Father Point, III.
8. Peubina Crossing, IV.
9. Pembina Crossing, III; Cockburn Island, Birnam III; W. Beaver Hills, III; Calgary, III; Red Deer, II; Savanne, Coldwater, II; Swift Current, IV; Medicine Hat, II; Quebec, IV; Haileybury, IV; Barrie.
10. Pembina Crossing, III; Chicoutimi, Bancroft, IV; Cannington Manor, IV; Sussex, Truro, III; Minnedosa II; Swift Current, IV; Quebec, IV; Channel Island, IV.
11. Pembina Crossing, III; Cannington Manor, II; Regina, III; Father Point, III.

12. Minnedosa, III; Haileybury, III.
15. Pembina Crossing, IV; Portage la Prairie, Hillview, II; Haileybury, IV; Channel Island, IV.
16. Minnedosa, III.
18. Cape Magdalen.
19. Red Deer, II; Sussex, Yarmouth, IV.
20. Truro, IV.
21. Pembina Crossing, IV.
23. Emerson.
24. Pembina Crossing, III; Treherne, Hillview, II; W. Beaver Hills, III; Calgary, III; Duck Lake, III; Barnardo, IV; Battleford, III; Quebec, III; Channel Island, IV.
25. Treherne, Stony Mountain, IV; Minnedosa, IV.
27. Pembina Crossing, IV.
28. Channel Island, IV.
29. Aweme, III; Pembina Crossing, II; Treherne, Portage la Prairie, II; Hillview, I; Cannington Manor, II; Red Deer, IV; Barnardo, II; Channel Island, IV.
30. Minnedosa, III.

Appearance of spring birds, &c.

Sparrows.—Ursa, 22nd; Gatesgarth, 19th; Beaver Creek, B.C., 2nd; Abitibi, 30th; N. Nicomen, 28th; Haileybury, 28th; Ridgetown, 19th; Bognor, 30th; Erasmus, 19th; Lakefield, 15th; Bancroft, 19th; St. Ann's, 27th; Port Hope, 14th; Peterborough, 15th; Sprucedale, 27th; Lucknow, 24th; Ursa, 22nd; Georgetown, 13th; Gravenhurst, 25th; Port Stanley, 19th.

Robins.—Ursa, 12th; Providence Bay, 6th; Princeton, 1st; Dalhousie, 16th; Donald, 6th; Gatesgarth, 16th; St. Stephen, 9th; Summerside, 15th; Brome, 8th; Bognor, 7th; Cockburn Island, 13th; Erasmus, 4th; Hamilton, 8th; Collingwood, 6th; Kimmount, 6th; Agincourt, 6th; Port Hope, 4th; Sprucedale, 11th; Lucknow, 1st; Pembina Crossing, 13th; Thompson, 12th; Montague, 5th; Jermyn, 6th; Emsdale, 13th; Arden, 7th; Fredericton, 23rd; Gravenhurst, 10th; Haileybury, 12th; Barrie, 7th; Oniskup, 23rd.

Blue Birds.—Donald, 9th; Chaplin, 6th; Welland, 24th; Erasmus, 10th; Georgetown, 6th; Arden, 7th.

Whippoorwill.—Clontarf, 29th; Erasmus, 28th.

Black Birds.—Midland, 16th; Princeton, 16th; Kitley, 5th; Gatesgarth, 19th; Coutts, 12th; Paris, 9th; Clontarf, 12th; Ridgetown; Welland, 7th; Bognor, 10th; Erasmus, 10th; Bancroft, 11th; Port Hope, 8th; Peterborough, 8th; Pembina Crossing, 17th; Rosebank, 21st; Georgetown, 9th; Arden, 1st; Fredericton, 16th; Emerson, 13th; Oniskup, 24th.

Wild Ducks.—Chaplin, 7th; Gatesgarth, 9th; Cannington Manor, 8th; Cartwright, 12th; Norquay, 10th; Bognor, 1st; Pembina Crossing, 10th; Gretna, 9th; Hillview, 11th; Barnardo, 12th; Rosebank, 11th; Portage la Prairie, 11th; Thompson, 2nd; Arden, 13th.

Geese.—Donald, 16th; Moose Jaw, 14th; Duck Lake, 5th; Chaplin, 7th; Gatesgarth, 10th; Cannington Manor, 9th; W. Beaver Hills, 14th; St. Stephen, 10th; Aweme, 9th; Cartwright, 14th; Coldwater, 12th; Norquay, 9th; Regina, 9th; Pembina Crossing, 10th; Gretna, 9th; Morden, 13th; Hillview, 12th; Barnardo, 10th; Oak Lake, 8th; Rosebank, 8th; Portage la Prairie, 10th; Thompson, 13th; Montague, 5th; Wyoming, 14th; Erasmus, 9th; Oniskup, 11th.

Crows.—Duck Lake, 10th; Aweme, 1st; Rapid City, 6th; Hillview, 16th; Barnardo, 6th; Rosebank, 2nd; Portage la Prairie, 6th; Savanne, 3rd; Regina, 12th; Emerson, 2nd.

Humming birds.—N. Nicomen, 17th.

Gulls.—Abitibi, 18th; Lakefield, 1st; Uplands, 8th; Pembina Crossing, 19th; Gravenhurst, 11th.

Meadow Larks.—Aweme, 10th; Cartwright, 10th; Welland, 28th; Lakefield, 22nd; Port Hope, 10th; Lucknow, 10th; Pembina Crossing, 12th; Gretna, 8th; Meadow Lark, 16th; Portage la Prairie, 17th.

Frogs.—Midland, 23rd; Princeton, 12th; Gatesgarth, 20th; Cannington Manor, 12th; Stony Creek, 18th; Paris, 12th; Summerside, 30th; Cartwright, 18th; Coldwater, 16th; Clontarf, 28th; Whiteside, 20th; Welland, 18th; Bognor, 21st; Erasmus, 7th; Beatrice, 18th; Bancroft, 23rd; St. Ann's, 4th; Agincourt, 20th; Meaford, 19th; Lucknow, 5th; Niagara, 13th; Pembina Crossing, 23rd; Hillview, 14th; Barnardo, 22nd; Rosebank, 10th; Portage la Prairie, 11th; Savanne, 22nd; Huntsville, 22nd; Wyoming, 13th; Sunshine, 19th; Scarboro, 17th; Truro, 15th; Georgetown, 14th; Emsdale, 23rd; Fredericton, 24th; Emerson, 12th; Gravenhurst, 18th; Stratford, 17th; Haileybury, 28th; Barrie, 24th; Oniskup, 25th.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN
WAS ABOVE THE HORIZON IN THE MONTH OF APRIL, 1899.

	HOURS ENDING															
	5 a.m.	6 a.m.	7 a.m.	8 a.m.	9 a.m.	10 a.m.	11 a.m.	Noon.	1 p.m.	2 p.m.	3 p.m.	4 p.m.	5 p.m.	6 p.m.	7 p.m.	8 p.m.
Victoria	0.61	0.47	0.34	0.46	0.53	0.59	0.62	0.60	0.64	0.58	0.58	0.54	0.40	0.12	.....	.....
Kuper Island .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Agassiz, B.C.	0.00	0.06	0.10	0.24	0.33	0.28	0.33	0.37	0.36	0.28	0.23	0.18	0.09	0.00	.....	.....
Battleford	0.10	0.38	0.38	0.43	0.53	0.57	0.61	0.65	0.66	0.61	0.62	0.57	0.48	0.37	0.17	.....
Indian Head	0.00	0.02	0.20	0.46	0.52	0.56	0.61	0.59	0.62	0.60	0.61	0.52	0.28	0.00	.....	.....
Brandon	0.00	0.28	0.42	0.56	0.63	0.69	0.70	0.68	0.68	0.60	0.55	0.39	0.24	0.00	.....	.....
Winnipeg	0.11	0.22	0.30	0.57	0.67	0.63	0.67	0.69	0.70	0.65	0.61	0.63	0.49	0.08	.....	.....
Durham	0.00	0.05	0.29	0.45	0.54	0.53	0.55	0.54	0.54	0.53	0.52	0.36	0.23	0.04	.....	.....
Woodstock	0.00	0.10	0.39	0.63	0.60	0.64	0.67	0.63	0.66	0.67	0.59	0.58	0.37	0.01	.....	.....
Toronto	0.00	0.25	0.53	0.61	0.63	0.65	0.66	0.68	0.60	0.65	0.63	0.59	0.57	0.21	.....	.....
Lindsay	0.06	0.40	0.44	0.53	0.55	0.67	0.72	0.60	0.72	0.66	0.54	0.51	0.44	0.25	.....	.....
Barrie	0.00	0.28	0.47	0.57	0.65	0.73	0.68	0.72	0.69	0.64	0.64	0.63	0.57	0.11	.....	.....
Kingston	0.05	0.44	0.72	0.75	0.73	0.70	0.63	0.63	0.60	0.63	0.62	0.59	0.35	0.00	.....	.....
Ottawa	0.06	0.37	0.61	0.68	0.70	0.70	0.73	0.67	0.63	0.63	0.68	0.65	0.44	0.08	.....	.....
Montreal	0.04	0.36	0.57	0.62	0.71	0.78	0.76	0.77	0.70	0.66	0.69	0.60	0.23	0.00	.....	.....
Fredericton	0.07	0.50	0.56	0.61	0.65	0.76	0.76	0.79	0.76	0.81	0.80	0.71	0.59	0.21	0.00	.....
	Victoria.	Kuper Island.	Agassiz.	Battleford.	Indian Head.	Brandon.	Winnipeg.	Durham.	Woodstock.	Toronto.	Lindsay.	Barrie.	Kingston.	Ottawa.	Montreal.	Fredericton.
Mean proportion for month	0.46	.....	0.27	0.49	0.41	0.46	0.52	0.37	0.48	0.56	0.55	0.54	0.55	0.56	0.63	0.63
(Constant sunshine being 1.)																
Difference from average	+ 14	.....	+ 06	0.00	- 07	+ 10	+ 04	—	+ 06	+ 07	+ 03	+ 11	00	.....	+ 11	+ 16
Maximum daily amount	0.90	.....	0.85	0.95	0.76	0.80	0.92	0.80	0.79	0.91	0.98	0.92	0.89	0.92	0.93	0.95
Date	23	.....	23	15	11	1	6	12	5	5	10	4	5	24	24	6
No. of days completely clouded	4	.....	10	4	4	5	4	11	12	1	1	3	3	4	3	12

APRIL FORECASTS.

The forecasts issued by this office at 11 p.m. each night, are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 840. These were divided as follows:—

DISTRICT.	No. Issued.	VERIFIED.			
		No. Fully	No. Partly	No. Not	Percentage
Manitoba	87	60	22	5	81.6
Lake Superior	86	59	21	6	80.8
Lower Lake Region	108	80	19	9	80.9
Georgian Bay	105	80	13	7	87.2
Ottawa Valley	92	67	11	14	78.8
Upper St. Lawrence	90	67	14	9	82.2
Lower St. Lawrence	88	71	7	7	88.1
Gulf	89	70	13	6	86.0
Maritime Provinces	95	73	18	4	86.3
Total	840	635	138	67	83.8

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by two and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent the predictions have been verified, the reports from the agents at all observing stations, as well as the telegraphic reports, are used.

OBSERVATIONS AT MARTIN'S FALLS, 1898.

Latitude N. 51° 30'. Longitude W. 86° 30'. Height, — feet.

	MEAN PRESSURE AT 32°.				MEAN TEMPERATURE.						PRECIPITATION.	
	9 a.m.	2 p.m.	7 p.m.	Mean.	9 a.m.	2 p.m.	7 p.m.	Mean Max.	Mean Min.	Monthly Mean.	Total Amount.	Depth of Snow.
	in.	in.	in.	in.	°	°	°	°	°	°	in.	in.
January ..	29.25	29.25	29.27	29.257	- 7.1	2.8	3.6	5.5	18.7	- 6.60	0.79	7.9
February ..	29.41	29.38	29.40	29.397	4.4	4.6	4.0	6.1	17.0	- 5.30	1.00	10.6
March.	29.20	29.26	29.30	29.283	9.6	19.3	9.6	20.9	2.5	11.70	0.95	9.5
April	29.38	29.34	29.40	29.373	33.5	43.5	36.0	46.1	16.8	31.45	0.05	0.5
May	29.26	29.22	29.21	29.230	48.0	57.5	50.6	60.4	35.3	47.85	1.10	0.6
June.	29.25	29.21	29.22	29.227	55.0	63.9	56.9	66.7	39.9	53.30	0.55	—
July.	..	..	..	..	..	..	..	..	..	..	..	..
August	29.20	29.19	29.19	29.193	57.9	66.4	58.2	69.0	45.6	57.30	1.52	—
September.	29.15	29.12	29.11	29.127	48.5	56.3	50.9	57.8	40.3	49.05	1.14	—
October	29.33	29.32	29.33	29.327	32.5	38.9	33.9	40.1	26.1	33.10	1.06	4.1
November .	29.20	29.18	29.18	29.187	17.5	22.2	18.0	23.1	9.7	16.40	2.17	21.7
December ..	29.41	29.09	29.13	29.110	- 0.1	6.6	1.2	7.4	- 8.6	- 0.60	0.35	3.5

OBSERVATIONS AT NORWAY HOUSE, N. W. TERRITORIES, 1898-99.

Latitude, N. 53° 58'. Longitude, W. 97° 52'. Height 730 feet.

	MEAN PRESSURE AT 32°.			MEAN TEMPERATURE.					PRECIPITATION.	
	8 a.m.	6.20 p.m.	Mean.	8 a.m.	6.20 p.m.	Mean Max.	Mean Min.	Monthly Mean.	Total Amount.	Depth of Snow.
	in.	in.	in.						in.	in.
January.....	29.10	29.08	29.090	10.6	-5.3	4.8	-17.1	6.15	0.77	7.7
February.....	29.28	29.28	29.280	8.5	-3.3	4.0	-16.6	-6.30	0.59	5.9
March.....	29.21	29.20	29.205	1.9	12.4	19.8	-7.9	5.95	0.69	6.9
April.....	29.21	29.19	29.200	32.5	38.6	44.9	21.1	33.00	0.46	0.3
May.....	29.17	29.13	29.150	48.6	55.0	64.4	35.9	50.15	0.22	*
June.....	29.06	29.05	29.055	52.9	57.7	66.0	43.8	54.90	1.21	
July.....	29.06	29.05	29.055	62.4	66.7	73.1	51.4	62.40	1.88	
August.....	29.05	29.07	29.075	59.2	62.0	67.3	51.6	59.45	5.38	
September.....	28.98	28.96	28.970	49.7	52.7	60.0	42.8	51.40	2.58	
October.....	29.18	29.16	29.170	29.6	32.0	37.8	25.8	31.80	0.90	5.9
November.....	29.07	29.09	29.080	8.3	10.3	18.7	1.5	10.70	1.48	14.8
December.....	29.07	29.09	29.080	-2.9	-0.3	8.9	-10.9	-1.00	0.83	8.3
1899.										
January.....	29.13	29.12	29.125	-16.8	-13.1	-5.0	-26.7	-15.85	0.33	3.3
February.....	29.13	29.13	29.130	21.4	-11.1	-3.9	-24.5	-14.20	0.71	7.1

OBSERVATIONS AT FORT CHURCHILL, HUDSON BAY, 1898.

Latitude, N. 48° 51'. Longitude, W. 94° 10'. Height, 38 feet.

	MEAN PRESSURE AT 32°.				MEAN TEMPERATURE.						PRECIPITATION.	
	6 a.m.	2 p.m.	10 p.m.	Mean.	6 a.m.	2 p.m.	10 p.m.	Mean Max.	Mean Min.	Monthly Mean.	Total Amount.	Depth of Snow.
	in.	in.	in.	in.							in.	in.
January	29.94	29.92	29.94	29.933	-25.7	21.1	-24.9	-14.0	-32.9	-23.45	0.50	3.0
February	30.16	30.16	30.15	30.157	-19.2	13.1	-16.3	-8.3	-27.7	-18.00	1.00	10.00
March.....	30.06	30.05	30.06	30.057	-18.3	-5.0	-11.7	1.5	-23.3	-10.90	0.80	8.0
April.....	29.96	29.95	29.94	29.950	21.2	31.2	24.5	35.4	17.0	26.20	1.25	11.9
May.....	29.99	29.97	29.97	29.977	31.2	38.3	31.0	45.4	25.3	35.35	1.20	1.0
June.....	29.85	29.84	29.85	29.847	42.4	49.4	42.8	59.2	33.9	46.55	0.88	5.5
July.....	29.74	29.76	29.72	29.740	52.5	58.4	52.2	67.2	30.4	48.80	1.00	
August.....	29.80	29.79	29.79	29.793	50.4	56.4	49.4	65.6	33.3	49.45	1.95	
September..	29.76	29.76	29.77	29.763	41.6	45.5	41.6	53.4	25.2	39.30	1.49	3.5
October.....	30.00	29.99	30.02	30.003	25.1	27.4	25.9	29.8	13.3	21.55	1.00	7.0
November.....	30.00	29.93	29.94	29.960	0.7	3.7	0.2	7.7	14.2	-3.25	0.92	9.2
December	29.88	29.87	29.85	29.867	-4.2	3.0	-6.6	8.8	-20.0	-5.60	0.57	5.7

OBSERVATIONS AT FORT CHIPEWYAN, 1898.

Latitude, N. 58° 43'. Longitude, W. 111° 10'. Height——feet.

	MEAN PRESSURE AT 32.				TEMPERATURE.						PRECIPITATION.	
	9 a.m.	2 p.m.	8 p.m.	Mean.	8 p.m.	2 p.m.	8 p.m.	Mean Max.	Mean Min.	Monthly Mean.	Total Amount.	Depth of Snow.
	in.	in.	in.	in.	"	"	"	"	"	"	in.	in.
January	29.05	29.06	29.08	29.067	-2.6	-0.1	2.6	4.2	-10.2	3.00	1.00	10.0
February	29.36	29.36	29.34	29.353	-13.1	-6.8	-8.1	-1.9	-18.1	-10.60	0.30	3.0
March.	29.27	29.28	29.29	29.280	4.1	12.4	6.6	15.8	-2.9	6.45	0.82	8.2
April.	29.14	29.14	29.14	29.140	31.6	42.7	34.0	45.4	24.0	34.70	0.29	0.5
May	29.13	29.12	29.12	29.123	47.8	59.9	49.3	62.2	39.9	51.05	0.56	2.5
June	29.19	29.18	29.18	29.183	53.6	63.3	54.7	64.7	42.4	53.55	2.49	0.5
July	29.09	29.08	29.08	29.083	62.2	68.9	59.8	71.8	50.6	61.20	1.22	—
August	29.13	29.11	29.12	29.120	59.1	65.5	56.0	68.1	48.8	58.45	3.52	—
September.	29.09	29.08	29.09	29.087	48.0	54.9	45.8	59.3	40.5	49.30	2.19	2.5
October	29.25	29.24	29.24	29.243	24.7	28.3	24.3	31.0	20.2	25.60	0.83	8.3
November	29.24	29.23	29.24	29.237	2.9	6.4	2.4	11.0	-4.6	3.20	0.70	7.0
December	29.11	29.12	29.15	29.127	1.2	4.1	-0.2	9.5	-7.1	1.20	0.29	2.5

OBSERVATIONS AT MOOSE FACTORY, H. B., 1898.

Latitude, N. 51° 16'. Longitude, W. 80° 56'. Height, 30.5 feet.

	MEAN PRESSURE AT 32.				TEMPERATURE.						PRECIPITATION.	
	9 a.m.	2 p.m.	7 p.m.	Mean.	9 a.m.	2 p.m.	7 p.m.	Mean Max.	Mean Min.	Monthly Mean.	Total Amount.	Depth of Snow.
	in.	in.	in.	in.	"	"	"	"	"	"	in.	in.
January	29.96	29.92	29.96	29.947	7.4	2.6	2.9	8.6	-17.4	-4.40	—	—
February	30.13	30.10	30.14	30.123	-2.8	5.1	-0.7	10.1	-15.0	-2.45	—	—
March.	30.00	29.95	29.97	29.973	16.2	25.5	20.0	31.2	3.7	-17.45	—	—
April.	30.06	30.03	30.03	30.040	33.3	41.7	36.3	44.2	22.2	33.20	—	—
May	29.89	29.87	29.87	29.877	47.2	52.0	48.1	58.7	37.2	47.95	2.75	1.0
June	29.92	29.87	29.87	29.887	55.7	60.3	55.8	66.6	42.9	54.75	2.32	*
July	29.86	29.85	29.85	29.853	61.9	67.4	63.2	72.7	50.5	61.60	1.97	—
August	29.85	29.82	29.82	29.830	59.2	65.4	59.3	67.9	48.3	58.10	2.09	—
September	29.79	29.78	29.78	29.783	50.8	55.8	52.4	59.8	43.4	51.60	0.72	—
October	30.04	30.00	30.02	30.020	36.5	41.7	37.1	45.4	31.1	38.25	1.42	—
November	29.88	29.88	29.90	29.887	22.4	27.6	21.9	31.4	16.6	24.00	1.22	6.5
December	29.80	29.77	29.80	29.790	2.4	7.6	4.8	14.5	-5.3	4.60	—	—

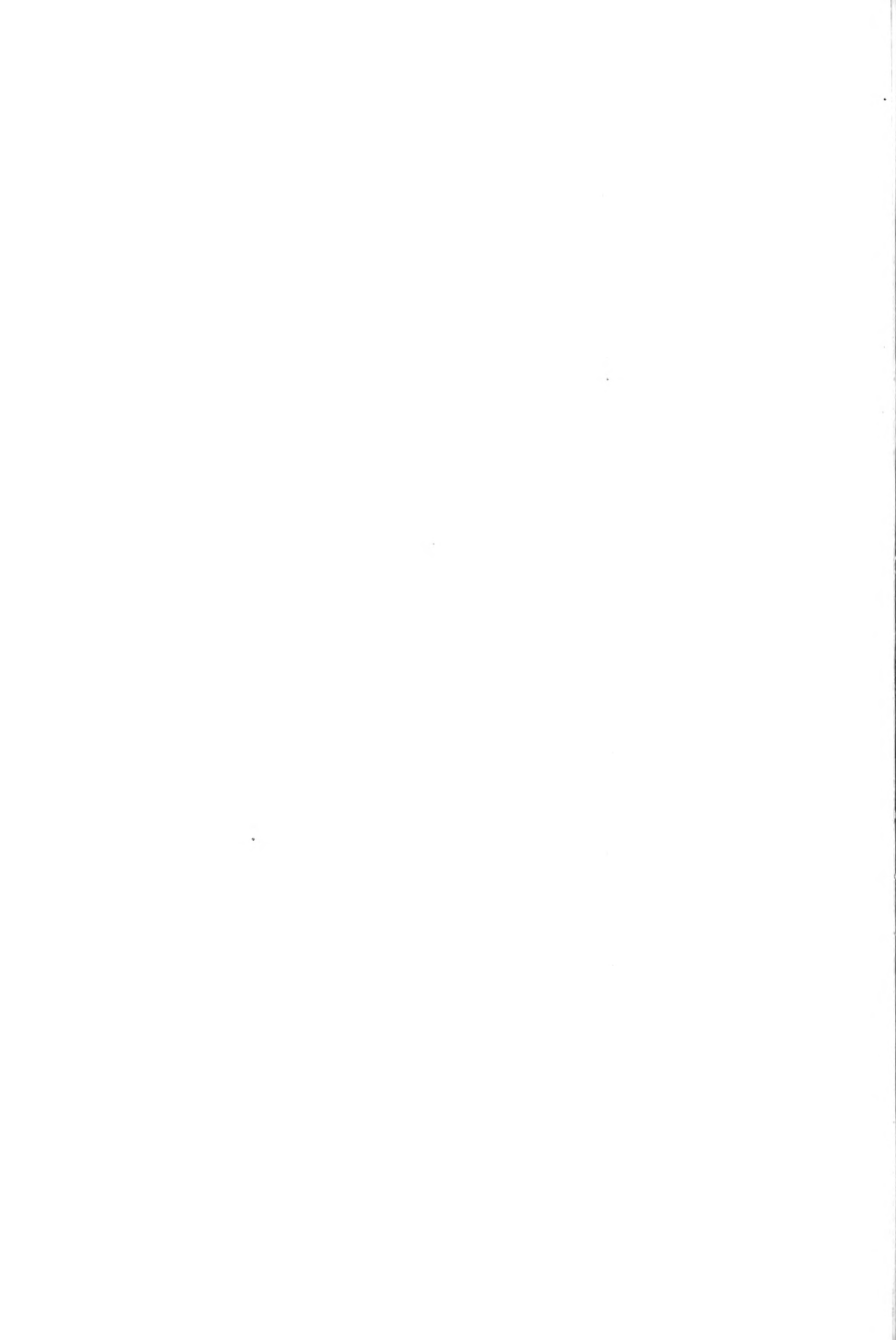
VOLUNTARY OBSERVERS.

Meteorological returns from voluntary observers for 1898, even from the most remote stations in Canada, now nearly all being in, the time seems opportune for a few remarks upon the work performed.

It would be hard to find a body of citizens who show more public spirit than the voluntary meteorological observer; in many cases, at the greatest inconvenience to himself, he will take at a regular set time, winter and summer, his series of observations, often foregoing other pleasures and calls upon his time in order to read his instruments at the appointed hour. In some instances these observations are taken twice or three times each day and in all weathers, after which they have to be checked and entered in their proper forms for mailing to the Central Office at Toronto. Without the aid of the voluntary observer it would be impossible to form a fair estimate of the climatic conditions of the country; and in a colony such as Canada where vast tracts are continually being opened up, a knowledge of these conditions is much sought after and is of much value to the incoming settler. The voluntary observers in Canada now number several hundred, the network of stations extending from the Atlantic to the Pacific and as far north as the Yukon District. There are many stations from which only rainfall observations are required, and although these are probably less interesting to the observer, they are extremely valuable, and the number of volunteers is continually increasing. The returns received for 1898 show undiminished interest in the work of observing and the efforts of the observers are much appreciated by the Meteorological Service.

R. F. STUART,
Director.

METEOROLOGICAL OFFICE,
TORONTO, May 26th, 1899.



METEOROLOGICAL SERVICE, DOMINION OF CANADA.

Monthly Weather Review.

VOL. XXIII

MAY, 1899.

No. 5

INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather forecasting, and reports by mail from voluntary observers and storm signal agents. For the material used in tracing the paths of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

REMARKS ON THE WEATHER.

The chief feature of the weather of May in Canada was the comparatively small amount of sunshine, low temperature, and heavy precipitation in the western portion of the country. These departures from the normal, however, were not very great, excepting locally in the temperature, and generally in the rainfall of the Territories. Frosts, though occurring in most districts throughout the country did comparatively little damage, and vegetation, though backward, was almost in average condition on the last day of the month.

In British Columbia, while the precipitation was almost normal there was much exceptionally cold dull weather, more especially during the first half of the month. Added to this were some frosts which doubtless checked vegetation and by the end of the month plant life generally was very backward. On the 30th, there was still much snow in the mountains and foothills.

The weather in the North-west Territories was exceptionally dull, cold and wet, the temperature being as much as 6° and 7° below average in Alberta, and the precipitation considerably above average in most districts. Snow fell at many places during the first half of the month, and on the 3rd and 4th some stations reported falls of five and six inches. Frosts were rather frequent during the month, the temperature falling to 12° at some places. These frosts, however, though retarding vegetation do not appear to have done much damage, and by the 31st the conditions were much improved.

The unpropitious weather of the Territories extended to Manitoba, but the conditions there were not quite so unfavourable: nevertheless it was wet and cool and there was little improvement until after the 19th. Snow fell in some districts during the earlier part of the month, and frosts which were for the most part light were general. Vegetation though backward made great progress during the latter portion of the month.

In Ontario the weather did not differ much from normal, the mean temperature, however, was somewhat above average, and the rainfall nearly everywhere was greater than normal. During the first and last ten days it was comparatively fine and warm, but from the 14th to 21st it was unpleasantly cool. Frosts occurred throughout the greater portion of the province, but they were not severe, excepting to the north of Lake Superior where 7° 0 and 18° 0 were recorded at Savanne and White River respectively. Little damage was caused by these frosts but the many unusually cool nights retarded vegetation and it was somewhat below normal on the last day of the month.

In the Province of Quebec the weather was for the most part fine warm and dry, some unusually low temperatures occurred however in the third week, and during this period it was comparatively dull and unpleasant. Frosts were almost general in the eastern portion of the province, 22° 1 being recorded at Father Point on the 5th. Some damage to vegetation was caused by these frosts, otherwise its condition was normal on the 31st.

The weather in New Brunswick did not differ much from normal, the departures, which were nowhere very great, being generally local. In the central portion the rainfall was in some cases quite light and although vegetation was about normal on the 31st, it was considerably retarded thereby in this portion of the province. Frosts were general but they were not severe and did little damage.

In Nova Scotia the weather conditions were almost normal, but in most districts the temperature was slightly below average, and while the rainfall was somewhat excessive in the south-western portion of the province it was comparatively light elsewhere. Frosts were recorded at all stations, 21.8 being reported from Truro on the 6th; nevertheless little damage was done to vegetation, which was in almost normal condition.

The weather in Prince Edward Island was for the most part fine, cold and dry, and frosts occurred rather more frequently than usual in most districts. Although vegetation made good progress during the latter part of the month it was below normal on the 31st.—F. F. PAYNE.

ATMOSPHERIC PRESSURE.

The mean atmospheric pressure was nearly equal with the average in British Columbia and the North-west Territories. East of Manitoba there was a general excess ranging from .02 to .06 of an inch.

HIGH AREAS.

Eight high areas have been charted; four of them moved south-east from Northern Manitoba and the Territories, three eastward from the North Pacific Coast of the United States, and one south-east across the Gulf and Maritime Provinces. Those from Northern Canada were the most pronounced, and one especially which appeared in Saskatchewan on the 17th, and moved very slowly to the Middle Atlantic Coast, was apparently the controlling factor in the weather of Western Canada for about a week.

LOW AREAS.

Ten low areas passed across the Dominion and the United States, and of this number eight first became visible in the Western States, thence moving north-eastward and eastward in rather erratic courses. The remaining two first appeared in British Columbia and traversed the breadth of the Dominion. No. 1 appeared in the Western States on the last day of April, and on the morning of May 1st, was centered in Minnesota as a well marked area; it caused a general rain over the western part of the Lake Region, and afterwards scattered showers occurred within its boundaries as it moved rapidly with diminishing energy to the seaboard. No. 2 formed in the Western States and moved northward to Manitoba and obviously an intimate connection existed between this area and the cold wave which occurred in the North-west Territories during several days. No. 3 may be traced from the Western States to the south of the Lake Region and thence to the southward of Nova Scotia. It developed as it passed seaward and a northerly gale occurred in Cape Breton. No. 4 was accompanied by heavy rain in Ontario on the 11th as it passed over the province. No. 5 took nearly the same course as the previous area and it was in its rear that occurred the second snow and cold spell of the month in the North-west Territories and heavy rain again fell in Ontario as the centre passed across that province. No. 6 appeared in the Western States, moved across the Lake Region to the Ottawa Valley and dipped to the New England Coast; it then developed and caused rain with gales in the Maritime Provinces and Gulf. No. 7 was confined to the Southwestern States. Nos. 8, 9 and 10 may be grouped together as they formed part of a general barometric depression which existed over the western and north-western portions of the continent from the 24th until the end of the month, at times extending over the Lake Region and the St. Lawrence Valley accompanied by numerous local rains which were at some places heavy.

WINDS.

In British Columbia the winds were as a rule moderate and did not at any time exceed the force of a fresh breeze, and were from directions between south and west nearly the whole month. In the North-west Territories the force of a moderate gale was reached on four occasions, the greatest number of winds coming from between north and east. This was also the case in the prevailing winds in Manitoba where they were fresh for the greater part of the month and on three occasions reached the force of a moderate gale. Winds were for the most part moderate in Ontario although the force of a strong breeze was reached locally on four occasions, no decided tendency for any special direction was shown. In Quebec the northeast and south-west winds were the most prevalent and they did not exceed the force of a strong breeze during the month.

Three gales were experienced in the Maritime Provinces, two of which were heavy locally, but were not warned.

TEMPERATURE.

The mean temperature of May was from 2 to 6 degrees below average in Manitoba, the North-west Territories and the greater part of British Columbia, and a little above average in Ontario, Quebec, and the larger portion of Maritime Provinces. Stations in Southern Alberta show the greatest departure below, and those in Central Ontario the greatest departure above average. The weather of the North-west Territories, was marked by two cold spells, the first of which occurred during the first few days of the month, when the

temperature fell to 12° at Calgary, 10° at Edmonton, and 21° at Qu'Appelle; and the second during the 12th and few following days, when 14° was recorded at Calgary, 15° at Edmonton, and 21° at Prince Albert and Winnipeg. This latter cold spell spread rapidly eastward across the Dominion, and was pronounced in Ontario from the 14th up to about the 21st. The last heavy frost occurred in the North-west and Manitoba about the 19th.

The Highest and Lowest Temperatures in each Province during May, 1899, were:

British Columbia.....	86° 0 on 21th at Griffin Lake.	6° 0 on 2nd at Barkerville.
North-west Territories	81° 5 on 23rd at Oonikup.	9° 5 on 12th at Mosquito Creek.
Manitoba	79° 0 on 30th at Roseberry,	12° 0 on 14th at Channel Island.
Ontario	86° 0 on 1st at Paris and Windsor.	7° 0 on 14th at Savanne.
Quebec	81° 0 on 1st at Richmond.	22° 4 on 5th at Father Point.
New Brunswick	81° 5 on 25th at Chatham.	25° 0 on 14th at Sussex.
Nova Scotia.....	79° 0 on 1st at Halifax.	21° 8 on 6th at Truro.
Prince Edward Island.....	71° 0 on 26th at Charlottetown.	28° 3 on 4th at Summerside.

PRECIPITATION.

In British Columbia, on the lower mainland and Vancouver Island, the precipitation was either equal to or greater than the average. In the North-west Territories it was much in excess of the average for May, and this was particularly the case in Southern Alberta, where it was several times greater than the average. Over the larger portion of Manitoba the rainfall was about average, some districts reporting a small excess, and others a small deficiency. A heavy snowfall, twenty inches at Qu'Appelle and nine inches at Prince Albert, occurred in Assiniboia and Saskatchewan between the 2nd and the 4th, and a smaller quantity fell in many parts of the Territories and Manitoba between the 12th and 14th. In Ontario generally the rainfall was above average to a small amount, but locally, in the counties of Elgin, Lambton and Bruce, there was a deficiency. From the Ottawa Valley eastward it was everywhere less than average—at Montreal about one-half, and in the more eastern portions of Quebec even less than one-half the average; in the Maritime Provinces a deficiency was pretty general, but not so pronounced as along the St. Lawrence.

PRESSURE, TEMPERATURE, WIND AND PRECIPITATION AT STATIONS IN THE DOMINION OF CANADA, MAY, 1899.

[illegible]

[illegible]

QUANTITY (continued)	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	2500	2600	2700	2800	2900	3000	3100	3200	3300	3400	3500	3600	3700	3800	3900	4000	4100	4200	4300	4400	4500	4600	4700	4800	4900	5000	5100	5200	5300	5400	5500	5600	5700	5800	5900	6000	6100	6200	6300	6400	6500	6600	6700	6800	6900	7000	7100	7200	7300	7400	7500	7600	7700	7800	7900	8000	8100	8200	8300	8400	8500	8600	8700	8800	8900	9000	9100	9200	9300	9400	9500	9600	9700	9800	9900	10000
Albany	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	2500	2600	2700	2800	2900	3000	3100	3200	3300	3400	3500	3600	3700	3800	3900	4000	4100	4200	4300	4400	4500	4600	4700	4800	4900	5000	5100	5200	5300	5400	5500	5600	5700	5800	5900	6000	6100	6200	6300	6400	6500	6600	6700	6800	6900	7000	7100	7200	7300	7400	7500	7600	7700	7800	7900	8000	8100	8200	8300	8400	8500	8600	8700	8800	8900	9000	9100	9200	9300	9400	9500	9600	9700	9800	9900	10000
Albany	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	2500	2600	2700	2800	2900	3000	3100	3200	3300	3400	3500	3600	3700	3800	3900	4000	4100	4200	4300	4400	4500	4600	4700	4800	4900	5000	5100	5200	5300	5400	5500	5600	5700	5800	5900	6000	6100	6200	6300	6400	6500	6600	6700	6800	6900	7000	7100	7200	7300	7400	7500	7600	7700	7800	7900	8000	8100	8200	8300	8400	8500	8600	8700	8800	8900	9000	9100	9200	9300	9400	9500	9600	9700	9800	9900	10000
Albany	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	2500	2600	2700	2800	2900	3000	3100	3200	3300	3400	3500	3600	3700	3800	3900	4000	4100	4200	4300	4400	4500	4600	4700	4800	4900	5000	5100	5200	5300	5400	5500	5600	5700	5800	5900	6000	6100	6200	6300	6400	6500	6600	6700	6800	6900	7000	7100	7200	7300	7400	7500	7600	7700	7800	7900	8000	8100	8200	8300	8400	8500	8600	8700	8800	8900	9000	9100	9200	9300	9400	9500	9600	9700	9800	9900	10000
Albany	100	200	300	400																																																																																																

PRECIPITATION AT STATIONS REPORTING RAIN, SNOW AND WEATHER DURING
MAY, 1899.

STATIONS.	RAINFALL.					SNOWFALL.					REMARKS.
	Amount in inches.	No. of Days of or Over	No. of Fair Days.	Heaviest Fall in Month.	Date	Amount in inches.	No. of Days.	Heaviest Fall in Month.	Date.		
BRITISH COLUMBIA—											
Beaver Creek.....	2.35	11	20	1.03	10						12th, hard frost.
Cumberland.....	2.23	8	23	0.18	16						12th, ice formed.
Nanaimo.....	4.53	11	20	0.76	12						
Langley.....	4.63	15	16	0.88	7						
Salt Spring Island.....	2.64	12	19	0.54	10						
Roy d'Oak.....	2.24	11	17	0.57	10						
N. W. TERRITORIES—											
Saltford.....	0.60	2	25	0.70	21	10.0	4	8.0	3		Last frost, 8th.
Souring.....				0.45	26	6.0	2	6.0	14		Rainiest May in 10 years.
Imustah.....	1.56	9	11	1.60	18	1.8	3	1.6	13		Frost on 29th.
W. Beaver Hills.....	1.82	9	19	0.71	27	2.5	1	2.5	11		
Dodbury.....	0.60	8	21	1.17	18	0.2	2	0.2	13		
Corts.....	3.61	8	29	1.01	18	5.5	3	5.0	14		Thunder with hail.
MANITOBA—											
Barbey.....	4.25	9	13	2.00	3						
Beaver Creek.....	1.16	6	27	0.92	26						
Rosberry.....	2.16	11	10	1.11	2		1		12		
Rapid City.....	1.64	1	27	0.53	26						Ice 1 inch on 13th.
Saskatoon.....	2.24	8	23	1.36	26						
Cartwright (26).....	1.46	8	21	0.60	4						
Greenwood.....	2.76	8	23	0.80	26						
Oak Lake.....	2.95	5	26	1.03	3						
Oakbank.....	1.73	7	23	0.45	26		1		12		Min. ther. 19° on 13th.
Pembina Crossing.....	2.61	2	20	0.73	26						
Shoal Lake.....	2.30	4	24	1.40	31	2.0	5	1.0	2		Min. ther. 15° on 13th.
Norway.....	2.36	10	17	1.36	29						
Turtle Mountain.....	1.04	8	21	1.02	26						
Elgin.....	3.30	12	18	1.55	3		1				
Cartwright.....	2.42	10	21	0.97							
Morden.....	3.30	6	21	1.60	26						
Belmont.....	2.40	11	1	1.11	3		2				
Gratia.....	1.15	8	23	0.50	25						
ONTARIO—											
Cherry Valley.....	2.15	5	26	0.75	28						
Wooler.....	4.47	14	17	1.25	1						
Scarbore.....	5.00	9	18	0.77	29						13th, ice formed.
Lansdowne.....	1.80	9	.....	0.41	30						
Barra.....	1.32	11	20	0.75	12						
Arden.....	3.41	13	18	0.74	20						15th, ice formed
Aurora.....	3.53	11	29	0.74	11						
Elgin.....	2.70	1	24	0.69	28						
Watford.....	4.41	2	24	0.70	17						
Port Barwell.....	4.42	10	21	1.03	12						
Jermyan.....	4.66	15	16	0.96	11						
Wingham.....	1.50	8	.....	0.60	17						
Chen Elm.....	1.87	11	23	0.66	29						
Midland.....	1.91	11	20	0.60	16						
Orangeville.....	4.25	14	17	0.72	29						
Uxbridge.....	3.82	12	19	0.67	11						14th, ice formed.
Sunshine.....	1.61	12	19	1.34	29						
Willow Grove.....	1.13	11	20	1.51	17						
Goderich.....	2.15	4	.....	0.70	16						
Georgetown.....	1.30	15	27	1.27	29						14th, ice formed.
Ignaceville.....	4.05	10	.....	0.85	17						
Wartou.....	2.68	6	.....	0.84	28						
London.....	4.22	11	20	1.50	28						
Enslade.....	1.40	10	.....	0.68	27						14th, ice 1 inch.
Oliver's Ferry.....	1.40	8	.....	0.47	27						
Dealtown.....	3.54	11	.....	0.98	16						
Montague.....	2.14	5	.....	0.66	29						
Huntsville.....	1.17	7	.....	0.75	20						
Golden's Mills.....	1.28	12	19	1.50	29						
Kitley.....	1.71	1	24	0.75	28		1				
Deer Park.....	1.19	12	19	0.62	11						
Uxbridge.....	4.28	11	.....	1.50	29						15th, ice formed.
Croydon.....	1.71	6	.....	0.65	1						
Lion's Head.....	1.70	2	.....	0.80	27						
Truro.....	2.82	11	.....	0.70	10						
Providence Bay.....	3.25	11	.....	0.84	16						
Sparrow Lake.....	3.87	11	.....	1.03	29						
Coldstream.....	4.63	11	.....	1.31	17						
Nottawasaga Island.....	4.40	6	.....	0.82	29						
Barton.....	2.47	5	.....	0.85	10						
NEW BRUNSWICK—											
Point Escombare.....	0.58	9	12	0.36	27						
NOVA SCOTIA—											
Port Morien.....	2.24	5	.....	0.72	31	0.5	1	0.5	4		
P. E. ISLANDS—											
Murray River.....	1.85	9	.....	1.33	25		1				
Mount Stewart.....	1.26	4	.....	1.35	25	2.5	2	1	4		

Aurora recorded—

Where the class of aurora is noted by the observer, it is given (I) being the brightest, (IV) the feeblest in brilliancy.

1. Cockburn Island, Nelson, Pictou, Treherne, Erasmus, Lucknow, Georgetown, III; Huntsville, II; Cape Magdalen, Durham, Coldwater, II; Gravenhurst, IV; Truro, IV; Prince Albert, I; Halifax, II; Barrie, III; Oonikup.

2. Savanne, Haileybury, III.

3. Birnam, III; St. Stephen, IV; Clontarf, III; Nelson, Red Deer, I; Erasmus, Meaford, Port Hope, Brantford, IV; Port Dover, Hamilton, Bancroft, III; Savanne, Huntsville, IV; Pembina Crossing, II; Toronto II. *Sudden and brilliant display at 10.40 p.m.* Halifax, II; Father Point, III; Quebec, II; Fredericton, III; Coldwater, III; Gravenhurst, II; Truro, IV; Medicine Hat, I; Haileybury, I; Barrie, IV; St. John, III.

4. Calgary, III; Clontarf, IV; Aweme, II; Hillview, I; Chicoutimi, Cape Magdalen, Quebec, IV; Medicine Hat, III; Swift Current, III; Kingston, I; Father Point, III; Haileybury, II.

5. Calgary, III; Cunningham Manor, III; Portage la Prairie, Aweme, III; Georgetown, IV; Battleford, IV; Cape Magdalen, Coldwater, I; Truro, IV; Medicine Hat, III; Prince Albert, IV; Father Point, III; Quebec, III; Haileybury, Oonikup.

6. Meaford, Haileybury.

7. Hillview, IV; Channell Island, IV; Savanne, Gravenhurst, IV; Father Point, III; Quebec, IV; Haileybury, III.

8. Savanne, Gravenhurst, IV; Haileybury, IV.

10. Pembina Crossing, III; Gravenhurst, IV.

11. Cockburn Island, Hillview, IV; Savanne, Emsdale, III; Huntsville, III; Coldwater, II; Truro, IV; Kingston, III; Father Point, IV.

12. Minnedosa, I.

13. Minnedosa, I.

14. Savanne.

15. St. Stephen, IV; Bancroft, II; Georgetown, IV; Kingston, I; Yarmouth, IV; Father Point, II; Quebec, IV; Haileybury, III.

16. Haileybury, III.

18. Hillview, IV.

19. Hillview, IV.

20. Hillview, IV; Savanne, Haileybury, IV.

21. Cunningham Manor, IV; Treherne, Hillview, II; Channell Island, IV; Pembina Crossing, IV.

22. Haileybury, IV.

26. Bancroft, IV.

30. Haileybury, IV.

31. Truro, IV.

Appearance of Spring Birds, &c.

Swallows.—Coutts, 16th; Gatesgarth, 19th; Red Deer, 9th; Qu'Appelle, 11th; Fredericton, 3rd; Barrie, 11th; Oonikup, 8th.

Whip-poor-Will.—Pembina Crossing, 16th; Gravenhurst, 2nd.

Cat bird.—Pembina crossing, 18th; Owen Sound, 1st.

Oriole.—Pembina Crossing, 21st; Lucknow, 1st; Owen Sound, 3rd.

Wren.—Pembina Crossing, 22nd.

Bobolink.—Pembina Crossing, 23rd; Scarboro, 6th; Erasmus, 15th.

Humming Bird.—Pembina Crossing, 30th; Arden, 13th; Clontarf, 24th; Port Hope, 10th; Stouffville, 13th; St. Stephen, 23rd; Barrie, 26th.

Robins.—Hillview, 4th; Barkerville, 2nd.

Yellow birds.—Arden, 16th; Barrie, 23rd.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE
THE HORIZON IN THE MONTH OF MAY, 1896.

	HOURS ENDING															
	5 A.M.	6 A.M.	7 A.M.	8 A.M.	9 A.M.	10 A.M.	11 A.M.	NOON	1 P.M.	2 P.M.	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	8 P.M.
VICTORIA	0.00	0.00	0.00	0.51	0.40	0.38	0.48	0.58	0.54	0.57	0.74	0.43	0.43	0.25	0.24	0.00
KUPER ISLAND .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
AGASSIZ, B. C. ....	.....	.....	0.00	0.10	0.24	0.30	0.30	0.33	0.30	0.28	0.22	0.20	0.16	0.17	0.02	0.00
BATTLEFORD	0.30	0.41	0.44	0.36	0.51	0.53	0.54	0.52	0.52	0.55	0.46	0.46	0.43	0.31	0.12	.....
INDIAN HEAD .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
BRANDON	0.23	0.50	0.50	0.58	0.55	0.56	0.53	0.48	0.48	0.48	0.55	0.42	0.37	0.27	.....	.....
WINNIPEG	0.04	0.30	0.55	0.30	0.45	0.48	0.49	0.49	0.46	0.45	0.41	0.41	0.38	0.26	0.24	.....
DURHAM .....	.....	0.02	0.24	0.36	0.45	0.57	0.50	0.57	0.61	0.58	0.65	0.60	0.42	0.23	0.06	.....
WOODSTOCK .....	.....	0.03	0.32	0.47	0.49	0.49	0.52	0.55	0.55	0.61	0.59	0.58	0.49	0.46	0.28	0.02
TORONTO .....	.....	0.17	0.43	0.55	0.50	0.50	0.55	0.57	0.55	0.50	0.55	0.60	0.33	0.47	0.32	0.02
LINDSAY	0.02	0.23	0.36	0.47	0.51	0.51	0.55	0.58	0.63	0.58	0.56	0.52	0.46	0.45	0.36	0.08
BARRIE .....	.....	0.11	0.46	0.47	0.46	0.50	0.54	0.55	0.60	0.59	0.56	0.60	0.64	0.50	0.26	.....
KINGSTON .....	.....	0.19	0.48	0.50	0.52	0.58	0.61	0.55	0.59	0.61	0.65	0.57	0.60	0.48	0.25	.....
OTTAWA .....	.....	0.25	0.51	0.52	0.55	0.57	0.58	0.62	0.57	0.57	0.58	0.58	0.56	0.55	0.26	.....
MONTREAL .....	.....	0.24	0.56	0.62	0.70	0.70	0.74	0.69	0.65	0.59	0.61	0.61	0.60	0.55	0.06	.....
FREDERICTON .....	.....	0.20	0.50	0.61	0.60	0.56	0.58	0.65	0.64	0.60	0.65	0.60	0.59	0.55	0.42	0.05

	VICTORIA.	KUPER ISLAND.	AGASSIZ.	BATTLEFORD.	INDIAN HEAD.	BRANDON.	WINNIPEG.	DURHAM.	WOODSTOCK.	TORONTO.	LINDSAY.	BARRIE.	KINGSTON.	OTTAWA.	MONTREAL.	FREDERICTON.
MEAN PROPORTION FOR MONTH..... (Constant sunshine being 1.)	0.35 .....	.....	0.19	0.42	.....	0.40	0.57	0.40	0.45	0.45	0.45	0.46	0.48	0.49	0.61	0.52
DIFFERENCE FROM AVERAGE.....	-0.07 .....	.....	-0.09	-0.05	.....	0.00	-0.16	+	-0.01	-0.03	-0.01	0.03	0.01	+	0.10	0.07
MAXIMUM DAILY AMOUNT	0.77 .....	.....	0.62	0.94	.....	0.88	0.91	0.81	0.88	0.93	0.95	0.87	0.90	0.91	1.00	0.91
DATE	27 .....	.....	7	21	.....	18	18	23	30	24	2	2	4	3	17	5
NO. OF DAYS COMPLETELY CLOUDED	4 .....	.....	14	0	.....	7	11	8	4	2	1	3	4	4	2	5

FORECASTS FOR MAY, 1899.

The forecasts issued by this office at 11 p.m. each night are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 877. These were divided as follows:—

DISTRICT.	No. Issued.	No. Fully.	VERIFIED.		Percentage.
			No. Partly.	No. Not.	
MANITOBA	89	70	13	6	86.0
LAKE SUPERIOR	32	28	30	2	78.5
LOWER LAKE REGION	111	80	21	10	81.5
GEORGIAN BAY	111	91	11	9	86.9
OTTAWA VALLEY	94	84	3	7	91.0
UPPER ST. LAWRENCE	23	20	10	4	90.3
LOWER ST. LAWRENCE	89	73	8	8	86.5
GULF	95	72	13	10	82.7
MARITIME PROVINCES	102	80	19	3	87.7
TOTAL	877	687	128	62	85.6

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by two and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent the predictions have been verified, the reports from the agents at all observing stations, as well as the telegraphic reports, are used.

The forecasts for May were issued by the Forecast Official, B. C. Webber.

HINTS TO OBSERVERS

(E. F. PAYNE.)

To those voluntary observers in Canada who extend their observations beyond the reading of their instruments and desire to make their records of auroras, thunder-storms, &c., as complete as possible we would suggest that in addition to noting the class to which the aurora belongs, as set forth in the book of "Instructions to Observers," a full description with the date and time of beginning and ending would add much to the value of the observation. If possible the altitude and azimuth of the arch should always be given, or its position may be explained by reference to some well known fixed stars. The extent and position of streamers, presence of corona, prismatic colours, waves, &c., should be noted and it would be well to mention whether changes are rapid or slow.

To most volunteer observers a full description of each thunder-storm may perhaps be found too tedious, therefore the following observations are suggested, they being of most importance.—Time when first and last thunder is heard, position of thunder cloud when first seen and when last seen, time of beginning and ending of rain or hail, direction and maximum force of the wind. If several storms occur on the same day they are considered as separate when a period or region of clear sky occurs between each.

Tornadoes do not often occur in Canada nor are they usually so destructive as those experienced in other latitudes; they are reported occasionally, however, and it is important that they should be properly described. The date and time of occurrence having been given, the following notes should be added:—Appearance of the tornado, direction in which it moved; direction of whirl, length and width of track, amount of rain, amount of destruction, position of trees and other objects thrown down, &c.

If a meteor is recorded, a full description should also be given, or if not seen by the observer, a trustworthy neighbour might be able to give the information desired. If possible its angular altitude and azimuth when first and last seen should be noted, together with remarks stating whether a report or vibration was noticeable, whether the white vapoury cloud left appeared to shift its position, and how long this cloud could be seen; also the time in seconds that elapsed before the sound was heard after the meteor passed.

Some further suggestions might be added, but we may give these in a later issue.

METEOROLOGICAL OFFICE,

TORONTO, June 26, 1899.

R. F. STUPART,

Director.

METEOROLOGICAL SERVICE, DOMINION OF CANADA.

Monthly Weather Review.

VOL. XXIII

JUNE, 1899.

No. 6

INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather forecasting, and reports by mail from voluntary observers and storm signal agents. For the material used in tracing the paths of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

REMARKS UPON THE WEATHER.

Throughout the greater portion of Canada the weather of June was about normal; and although both the mean temperature and rainfall were in excess of average in some districts, and below in others, these exceptions were generally unimportant, and any injurious effect upon vegetation was comparatively local; nevertheless plant life was still somewhat backward in most districts on the last day of the month.

In British Columbia the weather was for the most part cool and fine over the lower mainland and islands and dull over the upper mainland, the temperature being generally below the average and the amount of cloud somewhat excessive. The rainfall was rather less than average in most districts, but in a few places it was in excess. Towards the end of the month the weather became more settled and vegetation, though backward, was much improved.

The weather in the North-west Territories was cool and wet, and in some places the mean temperature was as much as 5° below average; there was, however, much bright sunshine which had a very beneficial effect. At a few places light frost occurred on or about the 5th, but apparently no damage was done. Thunderstorms were unusually frequent, but they were not destructive, and vegetation, though somewhat backward on the 30th, was in exceptionally vigorous condition.

In Manitoba the weather conditions were much the same as in the Territories, the mean temperature being lower and the rainfall somewhat greater than normal. After the 23rd the weather turned warmer and vegetation, which, up to this date was backward, made good progress.

In the Province of Ontario the weather varied considerably, it being dull, cool and unusually wet in the northern portion, and comparatively fine, warm and dry in southern districts; there were some exceptions to these conditions, however, but they were quite local. In counties bordering upon the western portion of Lake Ontario and the eastern portion of Lake Erie, the drought was severe and vegetation was somewhat affected, whilst in Muskoka and neighbouring districts the farming community complained of excessive rains. Ground frosts occurred at a few places, and there were many thunderstorms, but no damage appears to have been caused thereby.

With the exception of the rainfall which was rather heavy and exceeded the average over eastern Quebec, the weather in this province was almost normal, the mean temperature at a few eastern stations, however, where light frosts occurred, was below the average. Some severe thunderstorms passed over districts along the Upper St. Lawrence and damage was caused by hail, otherwise vegetation was in normal condition.

In New Brunswick the weather did not differ much from average excepting along the eastern coast, where there was much fog and rain. Light frosts occurred on or about the 10th at a few places, but did no damage, and navigation, though rather backward, was making good progress on the 30th.

The weather in Nova Scotia with a few local exceptions was almost normal; the rainfall along the Atlantic coast, however, was somewhat greater than usual, but there was much bright sunshine, and the condition of vegetation, though backward at the end of the month, was much improved.

In Prince Edward Island there was much dull weather, and during the early part of the month it was unusually dry; the total rainfall, however, was rather above average, and vegetation did not differ much from its normal condition.—F. F. PAYNE.

ATMOSPHERIC PRESSURE.

The distribution of pressure was below average from the Rocky Mountains to Manitoba, and above average in all the large remaining portion of Canada: the greatest excess, +060 to +080 inches, occurred in the Lake Region, the Ottawa Valley and on Vancouver Island, and the greatest departure below average—-070 inches in the north Saskatchewan Valley.

HIGH AREAS.

Six areas of high pressure were sufficiently well marked to be traced: a number well up to, if not exceeding, that for the usual June average.

No. 1. This moderate high passed between the 1st and 4th, from the northward of Lake Superior off the New England coast attended by very cool nights from the Lakes to the Atlantic. No. 2 was another very moderate high which first appeared on our Pacific coast on the 7th, reached the Lake Region on the 10th and passed off the New England coast on the 11th. No. 3 also appeared on our British Columbia coast, the date being the 13th. It spread gradually over the western portion of the Continent to the Lake Region, and then on the 17th passed southwards to the Southern States. No. 4 succeeded low area No. 7; it appeared near Lake Manitoba on the 20th; on the 21st it reached the Ottawa Valley, and on the 23rd passed off the Nova Scotian coast. It was only of moderate energy. No. 5 lay over the North Pacific States between the 20th and 22nd, and then spread very slowly to the Lake Region, eventually breaking up on the 27th. No. 6 was as well marked as any high of the series here considered. It developed in the rear of low area No. 10, and between the 29th and 30th its centre travelled from the Lake Superior region over the Lakes to the Middle Atlantic States.

LOW AREAS.

Ten low pressure areas were of sufficient importance to be traced, and what is unusual at this season of the year two of the number were attended by gales of wind, namely, No. 6 in the Gulf of St. Lawrence on the 21st, and No. 10 in the Lower Lakes on the 28th.

No. 1, a continuance of No. 10, on the May chart, after reaching the Ottawa Valley on the morning of the 1st, it passed to the Lower St. Lawrence Valley, and thence southward over the Maritime Provinces. It was attended in Eastern Canada by fresh to strong breezes and scattered showers and thunderstorms. Nos. 2 and 3—No. 2 was situated in Colorado on the 2nd, whence it travelled to northern Dakota, where it was joined by No. 3, the latter having previously travelled across the country from northern British Columbia. The system then moved into Manitoba where it was very energetic between the 4th and 6th. An off-shoot of the system meanwhile moved north of the Lake Region to the St. Lawrence Valley and the Maritime Provinces, but the main area remained over Manitoba until the night of the 6th when it also passed north of the Lake Region to the Gulf of St. Lawrence. During the presence of the system in Canada very heavy rains were experienced from the Rockies to Manitoba; numerous heavy rains were also general in the Lower St. Lawrence and the Maritime Provinces as well as in the Georgian Bay District and the Ottawa Valley, but elsewhere the rain was chiefly as scattered showers. No. 4 moved from the Northward very slowly over the Territories and Manitoba between the 9th and 12th accompanied by numerous showers, together with heavy thunderstorms, thence on the 13th with great rapidity far north over Canada to the Gulf of St. Lawrence, when showers and thunderstorms occurred generally in the Georgian Bay District and also in the Gulf of St. Lawrence. No. 5 was subsidiary to No. 4. It was situated over Kansas on the 13th, and after passing over the Lake Region and Upper St. Lawrence Valley on the 14th and 15th, it travelled on the 16th to the southward of the Nova Scotian coast. Rain fell generally from the Lakes to the Atlantic during the passage of this depression, and there were also some heavy local thunderstorms. No. 6—This was a shallow depression which moved into our North-west Territories on the 16th, and was attended there and in Manitoba until the following day by numerous thunderstorms. Early on the 18th its attendant thunderstorms spread to the Lake Superior region, and later in the day more locally to the Lower Lakes and Ottawa and St. Lawrence districts. No. 7 was situated over Alberta on the 17th: it appears to have been subsidiary to No. 6, and eventually proved itself to be one of the most energetic depressions of the month in that, as after reaching the Lake Superior region on the 19th, it passed southward as a depression of importance and caused gales on the 21st in the Gulf of St. Lawrence, which in some localities were very disastrous to the lobster industry. It was also accompanied by numerous showers and thunder storms in many localities. No. 8 was situated on the British Columbia coast on the 19th; on the 20th, 21st and 22nd it gave heavy rains and thunder storms from the Rockies to Manitoba. It passed far north over Canada to the Gulf of St. Lawrence, also causing scattered showers and thunderstorms in the Lake Region and the Ottawa and St. Lawrence Valleys between the 22nd and 23rd. No. 9 moved into the North-west Territories on the 25th from British Columbia and until the end of the month it hovered there, its presence being marked by many showers and heavy local thunderstorms as far as Manitoba. No. 10 was subsidiary to No. 9. It was first well marked over Montana on the 26th, whence it travelled across the southern portions of

Lakes Michigan and Erie. For a little while it became very energetic, and on the 28th it brought a gale in portions of the Lake Region which was locally severe on Lake Erie. At the same time rain fell from the Lakes to the Atlantic, and in many districts in considerable quantities.

WINDS.

The wind mileage for June was considerable in all portions of Canada and in many districts for the season of the year excessive. In British Columbia fresh to strong breezes prevailed on twenty-three days, the direction being almost entirely westerly. In the North-west Territories the westerly direction prevailed a little oftener than any other; fresh to strong breezes were experienced on nineteen days, and on five other days the force of a gale was reached. In Manitoba the winds blew from a westerly direction on fourteen days, and from an easterly on ten; three gales occurred, and there were seventeen days with fresh to strong breezes. In the Lake Region the force of a gale was reached on one occasion and fresh to strong breezes blew on twelve days; no one direction was especially predominant. In the St. Lawrence Valley and the Gulf the general direction on eighteen days was westerly; one gale occurred; this, however, was from a north-easterly direction; on sixteen days the winds were fresh to strong. In the Maritime Provinces the westerly direction prevailed on twenty-four days. There were fresh to strong breezes on thirteen days. The gale on the 28th in the Lake Region was duly warned, but that in the Gulf of St. Lawrence on the 21st and 22nd was not warned.

BRIGHT SUNSHINE.

Bright sunshine was above average over the larger part of the Dominion; the stations at Agassiz and Winnipeg would, however, indicate a deficiency in parts of British Columbia and Manitoba, and while all stations in Southern Ontario show a percentage larger than the average, much of the more northern portion of the Province was undoubtedly unsettled, cloudy and overcast. The largest amount registered was at Woodstock, Ontario, where it was 66 per cent of the possible, and the smallest amount was at Agassiz, B. C., where it was but 29 per cent of the possible.

TEMPERATURE.

In no part of the Dominion did the mean temperature differ much from average; the greatest departure was in Assiniboia and Southern Alberta, where it was 3 to 4 degrees below, and the greatest departure above was in various small districts in the vicinity of Lakes Huron, Erie and Ontario where it was about 3 degrees. In Manitoba, Quebec and the Maritime Provinces the temperature was either just normal or a little above.

The Highest and Lowest Temperature in each Province during June, 1899, were:

British Columbia,	88.0 on 22nd at Griffin Lake,	28.0 on 5th at Barkerville.
North-west Territories,	92.0 on 29th at Muscowpetung,	26.2 on 19th at Banff.
Manitoba,	87.0 on 29th at Portage la Prairie	30.0 on 8th at Winnipeg.
Ontario,	95.0 on 5th at Stony Creek.	26.0 on 10th at White River.
Quebec,	90.0 on 14th at Richmond.	30.1 on 4th at Father Point.
New Brunswick,	86.0 on 13th at Chatham.	32.5 on 11th at Sussex.
Nova Scotia,	85.0 on 15th at Wolfville.	31.0 on 5th at Sydney.
Prince Edward Island,	79.6 on 1st at Charlottetown.	41.0 on 5th at Hamilton.

PRECIPITATION.

The rainfall has been below average in British Columbia and in the southern part of Ontario from the Upper St. Lawrence Valley to the St. Clair River, and particularly so in the counties bordering on parts of Lakes Erie and Ontario; in Northern Ontario, and generally in the other Provinces it was either equal to or above the average, the most marked excess being along the north shores of the Georgian Bay and Lake Superior and thence westward to Alberta.

PRESSURE, TEMPERATURE, WIND AND PRECIPITATION AT STATIONS IN THE DOMINION OF CANADA, JUNE, 1899.

a. Barometer not reduced to Sea Level. * Stations not furnished with Registering Thermometers.

STATION.	Latitude N	Longitude W.	Elevation above Sea Level in feet.	PRESSURE.		TEMPERATURE.			Mean relative humidity.	No. of days complete.	DIRECTION OF WIND FROM								VELOCITY OF WIND.			PRECIPITATION.		No. of Auroras.	No. of Fog.	Days with 01 or more inches.											
				Mean reduced.	Highest.	Lowest.	Range.	Mean.			Difference from average.	Highest.	Lowest.	Date.	Mean daily range.	N.	N.E.	E.	S.E.	S.W.	W.	N.W.	C.				Total number of hours.	Mean miles per hour.	Highest velocity.	Date and direction from.	Amount.	Difference from average.	Highest fall in month.				
ONTARIO— Ottawa	45 30	75 35	187	29.92	30.23	29.00	0.74	67.4	2.6	36.0	6	40.0	9.28.9	59.1	59.1	1	59	17	0	94	31	44	200	134	46	720	12.8	25.6	5 W	0.54	0.64	0.36	0.25	0	0	0	0
Quebec	46 30	73 35	437	30.23	30.55	29.00	0.74	67.4	2.6	36.0	6	40.0	10.21.1	61.1	61.1	1	61	17	0	94	31	44	200	134	46	720	12.8	25.6	5 W	0.54	0.64	0.36	0.25	0	0	0	0
Montreal	45 30	73 35	437	30.23	30.55	29.00	0.74	67.4	2.6	36.0	6	40.0	10.21.1	61.1	61.1	1	61	17	0	94	31	44	200	134	46	720	12.8	25.6	5 W	0.54	0.64	0.36	0.25	0	0	0	0
St. John's	47 30	52 45	150	29.92	30.23	29.00	0.74	67.4	2.6	36.0	6	40.0	10.21.1	61.1	61.1	1	61	17	0	94	31	44	200	134	46	720	12.8	25.6	5 W	0.54	0.64	0.36	0.25	0	0	0	0
St. John's	47 30	52 45	150	29.92	30.23	29.00	0.74	67.4	2.6	36.0	6	40.0	10.21.1	61.1	61.1	1	61	17	0	94	31	44	200	134	46	720	12.8	25.6	5 W	0.54	0.64	0.36	0.25	0	0	0	0
St. John's	47 30	52 45	150	29.92	30.23	29.00	0.74	67.4	2.6	36.0	6	40.0	10.21.1	61.1	61.1	1	61	17	0	94	31	44	200	134	46	720	12.8	25.6	5 W	0.54	0.64	0.36	0.25	0	0	0	0
St. John's	47 30	52 45	150	29.92	30.23	29.00	0.74	67.4	2.6	36.0	6	40.0	10.21.1	61.1	61.1	1	61	17	0	94	31	44	200	134	46	720	12.8	25.6	5 W	0.54	0.64	0.36	0.25	0	0	0	0
St. John's	47 30	52 45	150	29.92	30.23	29.00	0.74	67.4	2.6	36.0	6	40.0	10.21.1	61.1	61.1	1	61	17	0	94	31	44	200	134	46	720	12.8	25.6	5 W	0.54	0.64	0.36	0.25	0	0	0	0
St. John's	47 30	52 45	150	29.92	30.23	29.00	0.74	67.4	2.6	36.0	6	40.0	10.21.1	61.1	61.1	1	61	17	0	94	31	44	200	134	46	720	12.8	25.6	5 W	0.54	0.64	0.36	0.25	0	0	0	0
St. John's	47 30	52 45	150	29.92	30.23	29.00	0.74	67.4	2.6	36.0	6	40.0	10.21.1	61.1	61.1	1	61	17	0	94	31	44	200	134	46	720	12.8	25.6	5 W	0.54	0.64	0.36	0.25	0	0	0	0
St. John's	47 30	52 45	150	29.92	30.23	29.00	0.74	67.4	2.6	36.0	6	40.0	10.21.1	61.1	61.1	1	61	17	0	94	31	44	200	134	46	720	12.8	25.6	5 W	0.54	0.64	0.36	0.25	0	0	0	0
St. John's	47 30	52 45	150	29.92	30.23	29.00	0.74	67.4	2.6	36.0	6	40.0	10.21.1	61.1	61.1	1	61	17	0	94	31	44	200	134	46	720	12.8	25.6	5 W	0.54	0.64	0.36	0.25	0	0	0	0
St. John's	47 30	52 45	150	29.92	30.23	29.00	0.74	67.4	2.6	36.0	6	40.0	10.21.1	61.1	61.1	1	61	17	0	94	31	44	200	134	46	720	12.8	25.6	5 W	0.54	0.64	0.36	0.25	0	0	0	0
St. John's	47 30	52 45	150	29.92	30.23	29.00	0.74	67.4	2.6	36.0	6	40.0	10.21.1	61.1	61.1	1	61	17	0	94	31	44	200	134	46	720	12.8	25.6	5 W	0.54	0.64	0.36	0.25	0	0	0	0
St. John's	47 30	52 45	150	29.92	30.23	29.00	0.74	67.4	2.6	36.0	6	40.0	10.21.1	61.1	61.1	1	61	17	0	94	31	44	200	134	46	720	12.8	25.6	5 W	0.54	0.64	0.36	0.25	0	0	0	0
St. John's	47 30	52 45	150	29.92	30.23	29.00	0.74	67.4	2.6	36.0	6	40.0	10.21.1	61.1	61.1	1	61	17	0	94	31	44	200	134	46	720	12.8	25.6	5 W	0.54	0.64	0.36	0.25	0	0	0	0
St. John's	47 30	52 45	150	29.92	30.23	29.00	0.74	67.4	2.6	36.0	6	40.0	10.21.1	61.1	61.1	1	61	17	0	94	31	44	200	134	46	720	12.8	25.6	5 W	0.54	0.64	0.36	0.25	0	0	0	0
St. John's	47 30	52 45	150	29.92	30.23	29.00	0.74	67.4	2.6	36.0	6	40.0	10.21.1	61.1	61.1	1	61	17	0	94	31	44	200	134	46	720	12.8	25.6	5 W	0.54	0.64	0.36	0.25	0	0	0	0
St. John's	47 30	52 45	150	29.92	30.23	29.00	0.74	67.4	2.6	36.0	6	40.0	10.21.1	61.1	61.1	1	61	17	0	94	31	44	200	134	46	720	12.8	25.6	5 W	0.54	0.64	0.36	0.25	0	0	0	0
St. John's	47 30	52 45	150	29.92	30.23	29.00	0.74	67.4	2.6	36.0	6	40.0	10.21.1	61.1	61.1	1	61	17	0	94	31	44	200	134	46	720	12.8	25.6	5 W	0.54	0.64	0.36	0.25	0	0	0	0
St. John's	47 30	52 45	150	29.92	30.23	29.00	0.74	67.4	2.6	36.0	6	40.0	10.21.1	61.1	61.1	1	61	17	0	94	31	44	200	134	46	720	12.8	25.6	5 W	0.54	0.64	0.36	0.25	0	0	0	0
St. John's	47 30	52 45	150	29.92	30.23	29.00	0.74	67.4	2.6	36.0	6	40.0	10.21.1	61.1	61.1	1	61	17	0	94	31	44	200	134	46	720	12.8	25.6	5 W	0.54	0.64	0.36	0.25	0	0	0	0
St. John's	47 30	52 45	150	29.92	30.23	29.00	0.74	67.4	2.6	36.0	6	40.0	10.21.1	61.1	61.1	1	61	17	0	94	31	44	200	134	46	720	12.8	25.6	5 W	0.54	0.64	0.36	0.25	0	0	0	0
St. John's	47 30	52 45	150	29.92	30.23	29.00	0.74	67.4	2.6	36.0	6	40.0	10.21.1	61.1	61.1	1	61	17	0	94	31	44	200	134	46	720	12.8	25.6	5 W	0.54	0.64	0.36	0.25	0	0	0	0
St. John's	47 30	52 45	150	29.92	30.23	29.00	0.74	67.4	2.6	36.0	6	40.0	10.21.1	61.1	61.1	1	61	17	0	94	31	44	200	134	46	720	12.8	25.6	5 W	0.54	0.64	0.36	0.25	0	0	0	0
St. John's	47 30	52 45	150	29.92	30.23	29.00	0.74	67.4	2.6	36.0	6	40.0	10.21.1	61.1	61.1	1	61	17	0	94	31	44	200	134	46	720	12.8	25.6	5 W	0.54	0.64	0.36	0.25	0	0	0	0
St. John's	47 30	52 45	150	29.92	30.23	29.00	0.74	67.4	2.6	36.0	6	40.0	10.21.1	61.1	61.1	1	61	17	0	94	31	44	200	134	46	720	12.8	25.6	5 W	0.54	0.64	0.36	0.25	0	0	0	0
St. John's	47 30	52 45	150	29.92	30.23	29.00	0.74	67.4	2.6	36.0	6	40.0	10.21.1	61.1	61.1	1	61	17	0	94	31	44	200	134	46	720	12.8	25.6	5 W	0.54	0.64	0.36	0.25	0	0	0	0
St. John's	47 30	52 45	150	29.92	30.23	29.00	0.74	67.4	2.6	36.0	6	40.0	10.21.1	61.1	61.1	1	61	17	0	94	31	44	200	134	46	720	12.8	25.6	5 W	0.54	0.64	0.36	0.25	0	0	0	0
St. John's	47 30	52 45	150	29.92	30.23	29.00	0.74	67.4	2.6	36.0	6	40.0	10.21.1	61.1	61.1	1	61	17	0	94	31	44	200	134	46	720	12.8	25.6	5 W	0.54	0.64	0.36	0.25	0	0	0	0
St. John's	47 30	52 45	150	29.92	30.23	29.00	0.74	67.4	2.6	36.0	6	40.0	10.21.1	61.1	61.1	1	61	17	0	94	31	44	200	134	46	720	12.8	25.6	5 W	0.54	0.64	0.36	0.25	0	0	0	0
St. John's	47 30	52 45	150	29.92	30.23	29.00	0.74	67.4	2.6	36.0	6	40.0	10.21.1	61.1	61.1	1	61	17	0	94	31	44	200	134	46	720	12.8	25.6	5 W	0.54	0.64	0.36	0.25	0	0	0	0
St. John's	47 30	52 45	150	29.92	30.23	29.00	0.74	67.4	2.6	36.0	6	40.0	10.21.1	61.1	61.1	1	61	17	0	94	31	44	200	134	46	720	12.8	25.6	5 W	0.54	0.64	0.36	0.25	0	0	0	0
St. John's	47 30	52 45	150	29.92	30.23	29.00	0.74	67.4	2.6	36.0	6	40.0	10.21.1	61.1	61.1	1	61	17	0	94	31	44	200	134	46	720	12.8	25.6	5 W	0.54	0.64	0.36	0.25	0	0	0	0
St. John's	47 30	52 45	150	29.92	30.23	29.00	0.74	67.4	2.6	36.0	6	40.0	10.21.1	61.1	61.1	1	61	17	0	94	31	44	200	134	46	720	12.8	25.6	5 W	0.54	0.64	0.36	0.25	0	0	0	0
St. John's	47 30	52 45	150	29.92	30.23	29.00	0.74	67.4	2.6	36.0	6	40.0	10.21.1	61.1	61.1	1	61	17	0	94	31	44	200	134	46	720	12.8	25.6	5 W	0.54	0.64	0.36	0.25	0	0	0	0
St. John's	47 30	52 45	150	29.92	30.23	29.00																															

[illegible]

OBSERVATIONS AT STATIONS REPORTING RAIN, WEATHER, &c., DURING JUNE, 1899.

STATIONS.	RAINFALL.				Date.	THUNDER OR LIGHTNING, &c.
	Amount in inches.	Days or Over.	No. of Fair Days.	Heaviest Fall in Month.		
BRITISH COLUMBIA						
Cumberland	1.00	1	26	0.48	28	
Beaver Creek	1.10	10	20	0.20	26	4
Langley	2.14	6	24	0.12	16	
Royal Oak	0.34	4	26	0.15	9	
Goldstream	0.84	5	25	0.25	10	
Nanaimo	0.91	5	25	0.48	26	
N. W. TERRITORIES						
West Beaver Hills	4.02	13	17	1.49	26	14, 15, 16, 21, 25.
Clear Spring	3.73	11	17	1.61	30	11, 12, 13, 20, 21, 27, 28, 29, 30.
Letfordbridge	2.71	10	20	0.85	20	
Coutts	2.26	8	22	0.55	21	23th. Heavy hail on 11th.
Didsbury	1.84	7	23	0.60	10	
Saskatoon	1.82	10	18	0.50	4	
Estevan	1.60	1	20	1.00	29	
Innisfail	2.79	9	21	1.47	22	
ONTARIO						
Georgetown	1.41	9	21	0.27	28	4, 5, 6, 7, 14.
Robin's Mills	2.32	6	23	0.72	6	5, 14.
Amora	1.50	4	26	0.52	4	4, 14. Frost on 9th.
Ardan	2.58	11	19	0.81	15	5, 8, 15, 19, 20, 21, 23, 26.
Woods	2.76	9	21	0.79	4	5, 6, 7, 23.
Jermya	5.26	8	22	0.74	28	4, 5, 6, 12, 15, 20.
Cherry Valley	1.22	2	28	0.71	4	4.
Lansdowne	1.61	5	25	0.67	27	7, 14, 25.
Montague	1.69	5	25	0.90	28	17th, light frost.
Glen Elmo	1.63	5	25	0.89	28	
Watford	1.33	6	24	0.53	14	
Dutton	0.60	4	26	0.35	28	1, 5, 6, 7, 28.
Wilton Grove	2.83	7	23	0.95	28	5, 6, 7.
Go-leuch	2.90	4	26	1.30	28	
Orangeville	2.75	6	24	0.93	14	2, 6, 23.
Warton	2.61	8	22	0.72	22	4, 5, 7, 12, 13, 14, 22.
Scarboro	1.33	6	21	0.43	4	4, 5, 6, 7, 14, 17.
Parma	3.63	8	22	0.80	1	
Ursa	1.16	11	19	1.04	14	10th. Frost on 22nd.
Providence Bay	5.59	17	19	3.12	4	7, 8, 12, 18, 20, 22.
Oliver's Ferry	1.89	7	23	0.82	28	
Port Burwell	0.52	9	21	0.31	28	5, 6, 7.
Kitley	1.54	4	26	1.10	28	
Lynsbeck	0.22	2	28	0.20	29	
Lyndale	1.30	12	18	1.05	28	4, 7, 12, 14, 20, 23.
Emmimore	1.63	8	22	1.10	23	
Dealtown	3.12	7	25	1.16	28	5, 6, 14, 18, 28.
Cybalodge	2.00	5	25	0.64	4	4.
Huntsville	6.68	12	18	2.25	4	4, 6, 20, 22.
Elgin	2.18	6	24	0.81	28	
Thompson	5.82	6	24	2.55	4	7th, hail from 1 to 6 in. diameter.
Deer Park	0.91	6	24	0.28	15	
Penetanguishene	3.30	14	18	0.78	28	5, 6, 22.
Coldstream	3.09	6	24	2.71	28	
Croydon	2.78	7	23	0.90	28	6, 13, 23, 25.
Sparrow Lake	3.57	10	20	1.29	5	5, 14, 18.
Nottawassaga	4.10	6	24	1.50	28	
Lion's Head	3.90	8	22	0.80	28	4, 5, 6, 7, 14, 18, 22.
Midland	3.98	13	17	0.91	5	3, 4, 5, 6, 12, 13, 14, 17, 21.
Princeton	0.55	2	28	0.10	5	
Wyoming	0.85	6	24	0.20	6	5, 6, 24.
NEW BRUNSWICK						
Point Esquimaux	2.30	11	19	1.30	21	16, 25, 26, 29.
NOVA SCOTIA						
Port Mores	5.18	5	25	2.90	22	
P. E. ISLAND						
Mount Stewart	2.20	6	24	1.52	16	
Murray River	2.50	10	20	0.94	16	

Thunder recorded at :

1. Brandon, Agincourt, Pipestone, Treherne, Perce, Dutton, Quebec, Minnedosa, Port Stanley.
2. Moncton, W. Beaver Hills, Edmonton.
3. Hill View, Portage la Prairie, Lakefield, Point Clark, Channel Island, N. Sister, Rose, Pipestone, Midland, Calgary, Orangeville, Port Hastings, Barnardo, Minnedosa.
4. Agincourt, Clontarf, Cockburn Island, Uplands, Whiteside, Collingwood, Lakefield, Point Clark, Hamilton, Owen Sound, Beatrice, Bancroft, Stony Creek, Gosfield S., Abitibi, Broome, Haliburton, Ottonabee, Midland, Lion's Head, Calgary, Peterboro, Welland, Kimmount, Sprucedale, Meaford, Lucknow, Penetanguishene, Scarborough, Providence Bay, Emsdale, Uxbridge, Huntsville, Wharton, Beaver Creek, Georgetown, Aurora, Jernyn, Cherry Valley, Meaford, Lindsay, Stratford, Coldwater, Gravenhurst, Durham, Guelph, Deseronto, Quebec, Winnipeg, Port Arthur, Parry Sound, White River, Port Stanley, Barrie.
5. Ridgetown, Birnam, Erasmus, Agincourt, Cunningham Manor, Cockburn Island, Collingwood, Lakefield, Point Clark, Hamilton, Owen Sound, Beatrice, Bancroft, Stony Creek, Gosfield S., Abitibi, Broome, Haliburton, Ottonabee, Midland, Lion's Head, Brantford, Calgary, Paris, Peterboro, Port Hope, Kimmount, Port Hope, Meaford, Sparrow Lake, Penetanguishene, Scarborough, Providence Bay, Dealtown, Wharton, Georgetown, Robins-Mills, Arden, Wooler, Jernyn, Dutton, Wilton Grove, Regina, Moose Jaw, Montreal, Woodstock, Lindsay, London, Stratford, Coldwater, Gravenhurst, Guelph, Grand Manan, Sauguen, Kingston, Port Arthur, Port Stanley, Wyoming, Barrie.
6. Hillview, Ridgetown, Erasmus, Agincourt, Cunningham Manor, St. Stephen, Sussex, St. Ann's, Collingwood, Lakefield, Point Clark, Hamilton, Owen Sound, Beatrice, Gosfield S., Birnam, Pipestone, Ottonabee, Midland, Lion's Head, Brantford, Paris, Peterboro, Welland, Meaford, Croydon, Scarborough, Dealtown, Huntsville, Georgetown, Arden, Wooler, Jernyn, Dutton, Wilton Grove, Woodstock, Lindsay, Stratford, Coldwater, Durham, Guelph, Halifax, Yarmouth, Grand Manan, Sauguen, Kingston, Parry Sound, White River, Port Stanley, St. John, Wyoming, Barrie.
7. Stouffville, Ridgetown, Birnam, Erasmus, Clontarf, Uplands, Lakefield, Point Clark, Owen Sound, Bancroft, Gosfield S., Abitibi, Ottonabee, Lion's Head, Paris, Peterboro, Welland, Port Hope, Sprucedale, Lucknow, Scarborough, Providence Bay, Emsdale, Orangeville, Wharton, Georgetown, Wooler, Lansdowne, Dutton, Wilton Grove, Lindsay, Stratford, Durham, Deseronto, Grand Manan, Kingston, Swift Current, Port Arthur, Parry Sound, Port Stanley, Barrie.
8. Agincourt, Lakefield, Peterboro, Arden, Barnardo, Lindsay.
9. Brandon.
10. Gatesgarth, Red Deer, Pipestone, Regina, Barnardo, Prince Albert, Swift Current, Medicine Hat.
11. Brandon, Gatesgarth, Portage la Prairie, Regina, Moose Jaw, Bathurst, Swift Current, Medicine Hat, Qu'Appelle, Winnipeg.
12. Brandon, Uplands, Whiteside, Lakefield, Point Clark, Owen Sound, Beatrice, Bancroft, Midland, Meaford, Lucknow, Ursin, Providence Bay, Emsdale, Huntsville, Wharton, Jernyn, Lindsay, Durham, Deseronto, Qu'Appelle, Port Arthur.
13. Chicoutimi, Stouffville, Birnam, Erasmus, Collingwood, Lakefield, Owen Sound, Abitibi, Midland, Kimmount, Meaford, Lucknow, Wharton, Point Esquimaux, Coldwater, Durham, Father Point, Port Arthur.
14. Ridgetown, Birnam, Erasmus, Agincourt, Cunningham Manor, Hamilton, P.E.I., Uplands, Collingwood, Lakefield, Point Clark, Chatham, Hamilton, Owen Sound, Beatrice, Bancroft, W. Beaver Hills, Red Deer, Haliburton, Midland, Lion's Head, Brantford, Calgary, Paris, Sprucedale, Meaford, Lucknow, Sparrow Lake, Sunshine, Scarborough, Emsdale, Dealtown, Wharton, Georgetown, Aurora, Lansdowne, London, Stratford, Coldwater, Lindsay, Durham, Deseronto, Sydney, Parry Sound, White River, Port Stanley, St. John, Barrie.
15. Birnam, Cunningham Manor, Duck Lake, Wolfville, St. Ann's, Hamilton, Stony Creek, Summerside, Welland, Sunshine, Arden, Jernyn, Woodstock, London, Gravenhurst, Guelph, Truro, St. John.
16. Hillview, Picton, Esquimaux, Barnardo, Truro, Yarmouth, Minnedosa.
17. Duck Lake, Bancroft, W. Beaver Hills, Midland, Scarborough, Stony Mountain, Quebec, Winnipeg, Minnedosa, Port Arthur.
18. Brandon, Birnam, Agincourt, Portage la Prairie, Lakefield, Lion's Head, Treherne, Kimmount, Meaford, Sarnia, Providence Bay, Dealtown, Georgetown, Lindsay, Bissett, Winnipeg, Barrie.
19. Cape Magdalen, Gosfield S., Calgary, Paris, Sprucedale, Sunshine, Arden, Kingston.
20. Hillview, Chicoutimi, Cunningham Manor, St. Stephen, Hamilton, P.E.I., Clontarf, Bancroft, Stony Creek, Abitibi, Haliburton, Paris, Peterboro, Croydon, Providence Bay, Emsdale, Huntsville, Arden, Regina, Montreal, Lindsay, Stratford, Deseronto, Ottawa, Kingston, Quebec, Swift Current, Qu'Appelle, Parry Sound.
21. Hillview, Renfrew, Hamilton, P.E.I., Sussex, Muscowpetung, Bronte, Midland, Arden, Fredericton, Chatham, Quebec, Winnipeg, St. John.
22. Erasmus, Cunningham Manor, Duck Lake, Cockburn Island, Uplands, Whiteside, Collingwood, Lakefield, Point Clark, Owen Sound, Beatrice, Pipestone, Lion's Head, Port Hope, Sprucedale, Meaford, Penetanguishene.

Steno, Ursa, Prosser Bay, Wiarton, Regina, Coldwater, Gravenhurst, Saugeen, Prince Albert, Battleford, Swift Current, Medicine Hat, Qu'Appelle, Parry Sound, Barrie.

23. Beatrice, Barrelet, Bromie, Peterboro, Kinnmount, Sprucedale, Regina, Croydon, Sunshine, Emsdale, Orangeville, Arden, Wooder, Montreal, Kingston, Barnardo, Lindsay, Quebec, Barkerville, Prince Albert, Qu'Appelle, Minnedosa.

24. Dallousie, Lakeside, Calgary, Father Point, Quebec, Wyoming.

25. Moncton, Hamilton, P.E.I., Uplands, Yarrow, W. Beaver Hills, Calgary, Yarmouth, Summerside, Croydon, Coutts, Point Escuminac, Lunenburg, Port Hastings, Fredericton, Edmonton, Port Arthur, St. John.

26. Hillview, Pictou, Cannington Manor, Duck Lake, Hamilton, P.E.I., Sussex, Red Deer, Pipestone, Summerside, Point Escuminac, Arden, Regina, Fredericton, Barnardo, Truro, Charlottetown, Bissett, Prince Albert, Battleford, Swift Current, Medicine Hat, Qu'Appelle, Minnedosa, St. John.

27. Duck Lake, Channel, Summerside, Clearspring, Regina, Fredericton, Winnipeg.

28. Gangesgarth, Point Clark, Gosfield, S., Treherne, Clearspring, Deadtown, Dutton, Barnardo, Swift Current, Minnedosa.

29. Brandon, Hillview, Moncton, Summerside, Clearspring, Sunshine, Point Escuminac, Stony Mountain, Chatham, Swift Current, Winnipeg.

30. Hillview, Renfrew, Clearspring, Barnardo, Stony Mountain, Swift Current, Winnipeg.

Aurora Borealis:

Where the class of aurora is noted by the observer, it is green, (I) being the brightest, (IV) the feeblest in brilliancy.

1. Savanne.

3. Quebec, IV.

9. Savanne, Minnedosa, III.

15. Duck Lake, IV.

27. Cannington Manor, Savanne, Minnedosa IV.

28. Georgetown, II; Huntsville, II; Menford, I; Port Hope, Port Dover, Midland, I; Channel Island, IV; Hamilton, St. George, Collingwood, Cockburn Island, Clontarf, III; Cannington Manor, I; Erasmus, Stouffville, Savanne, London, II; Stratford, Gravenhurst, II; Durham, I; Guelph, Deseronto, II; Saugeen, II; Kingston, II; Quebec, I; Barrie, II.

29. Georgetown, III; Menford, II; Port Hope, Welland, II; Channel Island, IV; Collingwood, Clontarf, IV; St. Stephen, IV; Erasmus, Stouffville, Stratford, Durham, IV; Guelph, IV; Grand Manan, IV; Kingston, III; Quebec, II; Swift Current, Barrie, IV.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN THE HOUR OF THE DAY HOURS
 THE HORIZON IN THE MONTH OF JUNE, 1888.

CONTINUED.

VICTORIA.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
KUPEE ISLAND.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
AGASSIZ.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
BATTLEFORD.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
INDIAN HEAD.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
BRANDON.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
WINNIPEG.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
DURHAM.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
WOODSTOCK.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
TORONTO.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
LINDSAY.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
BARRIE.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
KINGSTON.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
OTTAWA.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MONTREAL.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
FREDERICTON.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

	VICTORIA.	KUPEE ISLAND.	AGASSIZ.	BATTLEFORD.	INDIAN HEAD.	BRANDON.	WINNIPEG.	DURHAM.	WOODSTOCK.	TORONTO.	LINDSAY.	BARRIE.	KINGSTON.	OTTAWA.	MONTREAL.	FREDERICTON.
MEAN PROPORTION FOR MONTH..... (Corrected for day length).	0.46	—	—	0.74	—	0.4	0.7	—	0.7	—	0.79	0.62	0.79	0.77	0.64	0.7
DIFFERENCE FROM AVERAGE.....	0.04	—	—	—	—	—	—	—	—	—	—	0.14	—	—	—	—
MAXIMUM DAILY AMOUNT.....	0.82	—	—	0.8	0.7	0.8	0.7	0.88	0.7	0.8	0.8	0.8	0.8	0.87	—	0.8
DATE.....	18	—	—	7	28	24	29	29	2	2	29	2	7	27	27	27
NO. OF DAYS COMPLETELY CLOUDED.....	1	—	—	—	—	—	—	2	1	1	2	—	1	1	—	—

FORECASTS FOR JUNE, 1899.

The forecasts issued by this office at 11 p.m. each night are posted up at every telegraph station in Canada, and are for 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 907. These were divided as follows:—

DISTRICT.	No. Issued.	VERIFIED.			Percentage
		No. Correct.	No. Partly.	No. Not.	
GRAND PRAIRIE	80	64	26	11	79.4
LAKE SUPERIOR REGION	172	152	20	8	88.0
LOWER LAKE REGION	91	91	14	5	87.6
GULF OF ST. LAWRENCE	10	80	19	7	85.7
OTTAWA VALLEY	17	88	6	11	86.7
UPPER ST. LAWRENCE	12	12	8	0	90.6
LOWER ST. LAWRENCE	17	17	18	0	85.7
VAL D'AUVERGNE	7	7	10	8	82.0
MOUNTAIN PROVINCES	7	7	17	6	85.2
TOTAL	907	688	172	67	84.2

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by two and added to the number fully verified, the result being divided by the total number issued.

In ascertaining the extent to which the predictions are being verified, the reports from the agents at all observing stations, as well as the synoptic reports, are used.

R. E. STUPART,

Director.

Metereological Office, Toronto,
26 July, 1899.

METEOROLOGICAL SERVICE, DOMINION OF CANADA.

Monthly Weather Review.

VOL. XXIV

JULY, 1899.

No. 7

INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather forecasting, and reports by mail from voluntary observers and storm signal agents. For the material used in tracing the paths of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

REMARKS UPON THE WEATHER.

The weather of July like that of June did not differ much from average in Canada excepting in the rainfall, which was unusually heavy throughout the larger portion of the more eastern provinces. This heavy rainfall, coupled with much bright sunshine throughout the greater part of the Dominion, was most beneficial and although some districts suffered from drought vegetation generally was in about average condition on the 31st.

In the Province of British Columbia the weather was for the most part fine, warm and dry, but did not differ much from normal, and the condition of vegetation was excellent. Unusually high temperatures occurred on or about the 16th and 26th. 101.5 being recorded at Griffin Lake, and 99.4 at Kamloops on the 15th.

In the North-west Territories there was much bright sunshine, but in some districts much rain fell, whilst the mean temperature was about average. Thunderstorms occurred frequently, and in a few places, were accompanied by hail, though little damage appears to have been caused thereby. The maximum temperatures of the month occurred on the 17th or 18th. 102 being recorded at Chaplin, and at most places they were well above 90. Vegetation was in excellent condition on the 31st.

The weather in Manitoba was normal, both the temperature and rainfall being about average, and other conditions differing little. Thunderstorms occurred at most places, and together with plenty of sunshine were most beneficial. The dates upon which maximum temperatures occurred varied, but the readings were much the same as in the Territories. Vegetation was in about average condition on the 31st.

The chief characteristic of the weather in Ontario was the exceptionally heavy rainfall in northern and eastern districts, and drought or light rainfall elsewhere, the latter conditions also prevailing in districts north of Lake Superior. Cool nights and in most districts comparatively cool days with much bright sunshine prevailed making altogether ideal weather. On July 11th, at about 4.45 p.m. a most destructive hail storm passed over the district, 15 miles north of the town of Chatham. The storm's path was from north-west to south-east, was chiefly confined to the township of Chatham, and although felt, more or less, 15 miles upon either side of its path the area devastated was not more than a mile in width. The usual electrical display and heavy rain accompanied the storm, but no damage appears to have been caused thereby. According to reports, hail fell in some places to a depth of six inches upon level ground, some of the stones being one and a half inches in diameter, and many as large as walnuts. As might well be supposed the destruction was enormous, the "smiling farms" as one observer puts it "were converted into barren fields" and in many cases farmers lost all their crops. Corn was torn and left in tatters, whilst wheat and other cereals were completely threshed out, the stalks only being left standing. A thunderstorm also passed over the country in the vicinity of Gravenhurst, doing much damage to farm property. Vegetation, where not affected by drought, was in very good condition on the 31st.

In the Province of Quebec the rainfall was above average, and the mean temperature somewhat below; there was much fine bright weather, which brought vegetation forward; nevertheless, plant life in most districts, was below normal. Maximum temperatures nowhere reached 90.

The weather conditions of New Brunswick were much the same as in Quebec the rainfall being even heavier and much exceeding the average. Low temperatures, and much cloud and fog on the coast prevailed making some exceedingly unpleasant weather; and added to several destructive thunderstorms, the conditions were not favourable to vegetation.

Up to the 21st in Nova Scotia there was some exceedingly unpleasant weather with much rain and fog; after this date, however, it became fine and continued so to the end of the month. Both the temperature and rainfall were above average in most places, and although vegetation was somewhat backward, it made great progress after the 20th.

In Prince Edward Island the weather was for the most part cloudy with much rain, and although the mean temperature was above average, vegetation was quite backward. The highest maximum temperature reported was 82° 8 from Charlottetown.—F. F. PAYNE.

ATMOSPHERIC PRESSURE.

The mean atmospheric pressure was above average from the Rocky Mountains to Lake Superior, and average or a little below elsewhere over the Dominion, except along the Nova Scotian coast, where it was slightly above. The greatest amount above average .050 to .060 inches was recorded in Assiniboia, and the greatest amount below average .030 inches, was at Montreal.

LOW AREAS.

No less than ten depressions were sufficiently well marked to be charted, and there were others, of which the tracks were too doubtful. All of the ten travelled from the West or North-west either over the northern portion of, or to the northward of the Lake Region to the Gulf of St. Lawrence. The areas were also attended by much rain over nearly the whole of Canada, Southern Ontario proving the exception to the rule. The northerly track of the depressions may have been to a certain extent the cause of the paucity of the rainfall in Southern Ontario.

No. 1. A continuance probably of No. 9 on the June Chart. It was situated over Lake Superior on the morning of the 1st, and then moved quickly far north over Canada to the Gulf of St. Lawrence. During its presence thunderstorms were recorded on Lake Superior, and also over the Island of Anticosti. No. 2 was a very shallow depression, which passed over Manitoba to Lake Superior between the 2nd and 3rd, and then dispersed. It was attended, however, by local showers, and thunderstorms as far as the St. Lawrence Valley. No. 3 was first well defined on the morning of the 4th over the Upper Mississippi Valley as a very shallow depression. It was, however, attended by a very pronounced rain area, and as it moved slowly into the Lower Lake Region excessive rainfalls occurred on the 4th and 5th in the Georgian Bay District. It also caused heavy rains in the Ottawa Valley as well as in Quebec and the greater portion of the Maritime Provinces. No. 4 was situated in Northern Minnesota on the morning of the 6th; it formed in an existing low pressure trough. Its ultimate course was south-eastward over the Lake Region to the State of New York, and thence across the Maritime Provinces. It gave rain very generally from the Lakes to the Atlantic between the 7th and 10th together with moderate gales in portions of the Gulf and the Maritime Provinces. Between the 11th and 14th thunderstorms were numerous and heavy in the Ottawa and St. Lawrence Valleys and the Maritime Provinces and locally in the Lake Region attendant upon a shallow depression, which first appeared in the St. Lawrence Valley. No. 5 was a shallow depression, which moved into the Lower Lake Region on the 16th, from the Western States, thence down the St. Lawrence Valley and near the Straits of Belle Isle. It was attended by numerous showers and thunderstorms throughout its course, and by very strong westerly winds in the Gulf of St. Lawrence. No. 6 traversed the Territories and Manitoba between the 16th and 19th, accompanied by occasional showers and thunderstorms. Between the 20th and 21st, when it moved over Lake Superior to the St. Lawrence Valley where it dispersed, heavy rains and thunderstorms occurred in all localities to our Atlantic Coast except in Southern Ontario where there were local showers only. No. 7 was accompanied by numerous heavy showers and thunderstorms in the Territories and Manitoba between the 20th and 23rd, and it then passed far north over Canada reaching the Gulf of St. Lawrence on the 26th, showers and thunderstorms meanwhile occurring from the Lakes to the Atlantic, more especially in the Gulf and Maritime Provinces, where the rainfall was considerable. No. 8 passed into the Lake Superior district on the 26th from the Western States, thence to the Ottawa Valley and across the Maritime Provinces. Like many of its predecessors it gave numerous showers and thunderstorms from the Lakes to the Atlantic in nearly all localities except the southern portion of Ontario. No. 9 moved into the North Saskatchewan Valley during the night of the 26th, accompanied by high winds and showers. It travelled with great rapidity in a far northerly course and reached the Gulf of St. Lawrence on the 30th. Its accompanying showers and thunderstorms were locally experienced in Ontario, but very generally in Quebec and the Maritime Provinces, and it was especially noticeable for the high winds which it brought, these attaining the force of a gale in some localities, more especially perhaps in

the Georgian Bay Region. No. 10 was a shallow depression which moved into the North west during the night of the 29th and then passed south-eastwards giving showers and thunder-storms generally from the Rockies to Manitoba.

HIGH AREAS.

There was very little high pressure during the month, four areas were charted but they were of feeble energy only.

No. 1 was a very moderate high which was situated in Northern Manitoba on the 7th whence it passed southward and dispersed on the 10th over the Middle States. No. 2 was another shallow high which was situated in Alberta on the 5th and then passed south-eastward to the Middle States where it also dispersed. No. 3 was a small area which appeared over Lake Superior on the 21st in the rear of low No. 6 and travelled south-eastward over the St. Lawrence Valley and the Maritime Provinces. No. 4 moved into the North-west Territories on the 28th from Northern British Columbia and travelled in the rear of low area No. 9 to the Lower Lake Region where it broke up. It was accompanied by quite cool weather, and when in the Territories and Manitoba, night temperatures dangerously near the freezing point were recorded.

TEMPERATURE.

Temperature was a little above average over British Columbia, Manitoba and the extreme eastern portion of the Maritime Provinces, and average or a little below in all the larger remaining portion of the Dominion. The greatest amount above average, namely 6°, was recorded at Port Simpson, B.C., and the greatest amount below average, 4°, was at Barrie.

The Highest and Lowest Temperature in each Province during July, 1893, were:

British Columbia,	101.5 on 15th at Griffin Lake,	34.0 on 11th at Barkerville.
North-west Territories,	102.0 on 18th at Chaplin.	33.0 on 2nd at Banff.
“ “	“ “ “	“ 28th at Alameda.
Manitoba,	96.0 on 21th at Rosebank.	35.0 on 30th at Barnardo.
Ontario,	97.0 on 4th at Cottam.	28.0 on 19th at White River.
Quebec,	89.8 on 5th at Chicoutimi.	38.3 on 22nd at Chicoutimi.
New Brunswick,	89.7 on 2th at Fredericton.	40.1 on 1st at Sussex.
Nova Scotia,	87.0 on 27th at Halifax.	37.8 on 21st at Truro.
Prince Edward Island,	82.8 on 12th at Charlottetown.	47.0 on 23rd at Charlottetown.

PRECIPITATION.

The distribution of rain over the Dominion during the month was, in many respects, very remarkable. This was especially the case in Ontario, where, in several counties contiguous to Lakes Erie and Ontario, and also on the southern portion of Lake Huron, the amount of rain was exceedingly small, while in more northern localities rain fell frequently and heavily, and in some places the total fall for the month was abnormally large. A striking instance in the discrepancy in the rainfalls over different portions of the Province is shown between Wooler, near the Bay of Quinte and Ottawa City: the former place records a total fall for the month of only 0.3 inches, the latter 7.6 inches, and Ottawa Experimental Farm as much as 9.9 inches. The rainfall was also much above average in many portions of the North-west Territories and throughout Quebec and the Maritime Provinces. At Montreal and Yarmouth the average amount was exceeded by 3.6 inches, and at St. John by 4.2 inches.

WINDS.

In British Columbia the general direction of the wind was on the whole westerly, on fourteen days fresh breezes were experienced and on two occasions there were strong winds. In the North-west Territories and Manitoba no one direction prevailed, there were, however, numerous fresh breezes and on three or four occasions strong winds were recorded. In the Lake Region light to moderate variable winds largely predominated, on several occasions, however, the winds became strong from the westerly direction, and between the 29th and 30th a moderate west to north-west gale was felt in many localities, more so, perhaps, in the Georgian Bay Region than elsewhere. In the St. Lawrence Valley and the Gulf the winds were westerly on fourteen days and generally variable on others, there were eight days of fresh breezes, five of strong breezes and on one occasion a moderate gale was locally recorded. In the Maritime Provinces the direction was largely westerly, on twelve days the winds were fresh and on two strong.

BRIGHT SUNSHINE.

Bright sunshine was above average in all portions of Canada where sunshine observations are taken except at Fredericton, N.B., where it was a little below. It is also probable that the average amount of sunshine was not maintained in the more northern portions of Ontario. Toronto registered the largest amount, 68 per cent of the possible. Victoria 67 per cent, Battleford 66 per cent, Winnipeg 64 per cent.

PRESSURE, TEMPERATURE, WIND AND PRECIPITATION AT STATIONS IN THE DOMINION OF CANADA, JULY, 1899.

[illegible]

[illegible]

PRECIPITATION AT STATIONS REPORTING RAIN, WEATHER, &c., DURING JULY, 1899.

STATIONS.	RAINFALL.					THUNDER OR LIGHTNING, &c.
	Amount in inches.	Days of or Over.	No. of Fair Days.	Heaviest Fall in Month.	Date.	
BRITISH COLUMBIA.—						
Cumberland.....	1.83	3	28	0.60	21	
Langley.....	0.92	5	26	0.25	3	
Beaver Creek.....	1.20	4	27	0.60	23	
Nanaimo.....	0.73	3	28	0.73	22	
Royal Oak.....	0.10	1	30	0.10	3	
N. W. TERRITORIES.						
Estevan.....	2.76	5	26	2.00	25	
Didsbury.....	2.22	10	21	0.45	4	8, 20.
Coutts.....	3.44	11	20	1.10	3	
Saltevents.....	0.22	6	25	0.50	7	
Imperial.....	6.53	8	23	2.58	30	
Leitchbridge.....	2.53	6	25	1.35	22	
West Beaver Hills.....	3.72	13	18	1.00	6	10, 13, 18, 22, 26.
Rouleau.....	2.23	8	23	0.48	5	
MANITOBA.						
Ullswater.....	3.28	9	22	2.67	5	
Greenwood.....	3.55	9	22	1.26	31	
Oakbank.....	2.41	12	17	0.43	11	9, 14, 18, 27.
Morden.....	2.10	3	25	1.50	6	
Turtle Mountain.....	2.31	5	26	2.10	5	3, 5, 9.
Rapid City.....	1.76	5	26	0.77	31	
Clear Spring.....	2.23	10	18	0.57	6	1, 2, 3, 11, 19, 21, 23, 27, 31.
Greta.....	3.96	9	21	1.25	6	21, 22, 31.
Penhna Crossing.....	1.31	7	17	1.71	6	21, 22, 25, 26, 27.
Selkirk.....	2.14	9	22	0.80	31	9, 11, 14, 17, 18, 23, 31.
Elgin.....	1.19	12	17	0.46	6	2, 3, 8, 9, 11, 15, 22.
Oak Lake.....	1.07	3	28	0.43	31	
Shoal Lake.....	0.30	1	29	0.30	31	
Cartwright (2).....	2.18	4	23	1.10	22	
Hartney.....	1.61	7	24	0.78	6	
Belmont.....	3.61	9	22	2.34	22	1, 2, 14, 15, 18, 20, 22, 25, 26.
Cartwright (1).....	2.87	10	21	1.11	3	2, 3, 5, 11, 15, 20, 22, 31.
Norquay.....	3.16	12	19	1.81	12	1, 3, 12, 15, 19, 21, 23, 27, 28, 29.
Beaver Creek.....	1.76	5	26	0.72	22	
ONTARIO.						
Providence Bay.....	1.62	8	22	0.35	7	17, 25, 26.
Penetanguishene.....	3.37	12	19	1.32	5	
Lion's Head.....	3.22	8	23	0.90	5	7.
N. Williamsburg.....	7.24	12	19	1.33	5	5, 8, 10, 11.
Huntsville.....	3.60	10	21	1.25	25	
Thompson.....	2.16	3	28	0.91	20	
Sunshine.....	4.00	12	19	1.31	8	3, 11, 21.
Ursa.....	3.34	12	19	0.83	5	
Port Burwell.....	4.99	5	26	0.79	29	
Sparrow Lake.....	1.88	6	24	1.21	3	3, 4, 5, 8.
Glen Elm.....	6.23	10	21	1.79	8	1, 20.
Mostague.....	7.10	6	25	3.14	8, 9	5, 21.
Croydon.....	2.41	5	26	1.20	10	
Oliver's Ferry.....	4.61	8	23	1.32	6	
Parma.....	1.20	4	27	0.50	8	
Wyoming.....	1.47	6	25	0.50	7	3, 7, 11.
Lansdowne.....	2.17	7	24	0.95	9	8, 9, 17, 21, 29.
Arlan.....	3.11	12	19	0.70	5	5, 9, 12, 18, 21, 27, 30.
Jernyn.....	2.21	4	27	1.51	8	3, 4, 8.
Wooler.....	0.32	4	27	0.13	9	20.
Dutton.....	1.61	6	25	0.62	7	5, 7, 11, 22, 24.
Scarboro.....	1.35	9	18	0.58	8	7, 8, 15, 21, 25, 27, 29.
Watford.....	1.78	6	25	0.81	7	
Wilton Grove.....	0.81	6	25	0.20	25	7, 11.
Goherich.....	1.75	6	25	0.50	3	
Milband.....	2.42	11	20	0.68	25	3, 4, 5, 7, 25, 26.
Aurora.....	3.02	8	23	0.79	7	3, 7, 8.
Lynedoch.....	1.75	6	25	0.73	17	
Emisdale.....	4.04	12	19	1.87	6	4, 5, 7, 21, 26.
Georgetown.....	1.90	12	16	0.47	15	3, 4, 5, 7, 10, 11, 26, 27, 29.
Emmsmore.....	1.52	5	26	0.50	10	
Orangeville.....	3.45	9	22	1.09	4	3, 4, 8.
Dealtown.....	2.22	8	23	0.81	20	7, 29.
Roblin's Mills.....	1.85	3	28	0.85	8	
Cherry Valley.....	1.17	3	28	0.86	8	
Elbridge.....	3.04	7	24	0.81	8	5, 7, 11.
Warton.....	3.41	6	25	2.30	15	3, 4, 15.
Princeton.....	1.68	3	28	0.63	25	
Deer Park.....	0.30	6	24	0.11	16	
Elgin.....	2.31	7	24	1.00	9	
Nottawasaga.....	3.00	7	24	0.80	5	
NEW BRUNSWICK.						
Point Eschumac.....	6.77	18	13	1.23	9	4, 5, 18.
NOVA SCOTIA.						
Port Morden.....	5.02	11	20	1.68	18	
P. E. ISLAND.						
Mount Stewart.....	4.52	9	22	1.67	7	31.
Murray River.....	5.15	13	18	1.35	12	14.

Thunderstorm—Cont—

1. Stony Mountain, Kneehill, Savanne, Clear Spring, Belmont, Norquay, N. Sister Rock, Moose Factory.
2. Percé, Mosquito Creek, Calgary, Nicola Lake, Lucknow, Clear Spring, Pembina Crossing, Elgin, Belmont, Swift Current, Meaford, Hat, Emerson, Oonikup.
3. Whiteside, Stratford, Durham, Owen Sound, Portage la Prairie, Nicola Lake, Beatrice, Jermyn, Hamilton, Kinnaird, Meaford, Erasmus, Agincourt, Bancroft, Stony Creek, Point Clark, Barnum, Sunshine, Sparrow Lake, Wyoming, Midland, Aurora, Georgetown, Orangeville, Warton, Turtle Mountain, Clear Spring, Elgin, Norquay, Battleford, Medicine Hat, Parry Sound, Toronto, Emerson, Yarrow, Barrie, Moose Factory.
4. Whiteside, Crane Lake, London, Lindsay, Coldwater, Durham, Mosquito Creek, Owen Sound, Brome, Beatrice, Meaford, Erasmus, Bancroft, Point Esquimaux, Glen Elm, Jermyn, Midland, Emsdale, Orangeville, Warton, Bermuda, Swift Current, Medicine Hat, Barrie, St. John.
5. Montreal, Stratford, Coldwater, Durham, Truro, Fredericton, Pictou, Moncton, Calgary, Kneehill, Beatrice, Clontarf, St. Anne, Meaford, Bancroft, Brantford, Sprucedale, Welland, Lucknow, N. Williamsburg, Sparrow Lake, Montague, Arden, Dutton, Midland, Emsdale, Uxbridge, Sydney, Bermuda, Ottawa, Swift Current, Port Stanley, Charlottetown, Barrie.
6. Rosebank, Stony Mountain, Fredericton, Port Hastings, Red Deer, Brome, Point Clark, Sydney, St. John, Ottawa, Kingston, Quebec.
7. Stratford, Lindsay, Guelph, Durham, Stony Mountain, Woodstock, Calgary, Red Deer, Griffin Lake, Clontarf, Uplands, Gosfield S., Ridgetown, Bancroft, Point Clark, Sprucedale, Providence Bay, Lion's Head, Wyoming, Dutton, Scarborough, Wilton Grove, Midland, Aurora, Emsdale, Georgetown, Daulton, Uxbridge, Banff, Medicine Hat, Parry Sound, Toronto, N. Sister Rock, Barrie.
8. London, Macleod, Hillview, Kneehill, Beatrice, Clontarf, Otonabee, Agincourt, Scarborough, Stouffville, Peterboro, Bancroft, Point Clark, Sparrow Lake, Lansdowne, Jermyn, Orangeville, Pembina Crossing, Elgin, Didsbury, Prince Albert, Ottawa, Calgary, Medicine Hat, Port Stanley, Kingston, Yarmouth, Toronto, Barrie.
9. Rosebank, Crane Lake, Stony Mountain, Portage la Prairie, Pipestone, Kneehill, Duck Lake, Red Deer, Stouffville, Lansdowne, Arden, Oakbank, Turtle Mountain, Selkirk, Elgin, Battleford, Medicine Hat, Winnipeg, Kingston, Yarmouth.
10. Crane Lake, Moose Jaw, Gatesgarth, Duck Lake, Bullion, Point Clark, W. Beaver Hills, Bermuda, Swift Current, Medicine Hat, Saugeen, Quebec, N. Sister Rock.
11. Rosebank, London, Lindsay, Durham, Stony Mountain, Barnardo, Portage la Prairie, Treherne, Hillview, Clontarf, Gosfield S., Kimmount, Meaford, Otonabee, Ridgetown, Agincourt, Bancroft, Sarnia, Brantford, Point Clark, Port Dover, Lucknow, N. Williamsburg, Sunshine, Wyoming, Dutton, Wilton Grove, Uxbridge, Clear Spring, Pembina Crossing, Selkirk, Battleford, Prince Albert, Swift Current, Minnedosa, Port Stanley, Toronto, Oonikup.
12. Rosebank, Crane Lake, Deseronto, Stony Mountain, Brome, Welland, Norquay, Ottawa, Quebec, Father Point Oonikup.
13. Wolfville, Percé, Truro, Fredericton, Calgary, Brome, Savanne, Prince Albert, Medicine Hat, Quebec, Grand Manan.
14. Mosquito Creek, Truro, Summerside, Channel, Pictou, Hillview, Brome, Tobacco Plains, Murray River, Oakbank, Pembina Crossing, Selkirk, Elgin, Belmont, Swift Current, Medicine Hat, Minnedosa, Yarrow.
15. Aweme, Stony Mountain, Pipestone, Brandon, Otonabee, Ridgetown, Scarborough, Warton, Pembina Crossing, Elgin, Belmont, Norquay, Quebec, Moose Factory.
16. London, Barnardo, Calgary, Griffin Lake, Clontarf, Otonabee, Peterboro, Calgary, Emerson.
17. Whiteside, Stratford, Lindsay, Gravenhurst, Beatrice, Clontarf, St. Anne, Gosfield S., Bancroft, Brantford, Paris, Providence Bay, Lansdowne, Arden, Selkirk, Parry Sound, Quebec.
18. Moncton, Hillview, Gatesgarth, Duck Lake, Red Deer, Cannington Manor, Brandon, Clontarf, Uplands, Brantford, Point Esquimaux, Oakbank, Selkirk, W. Beaver Hills, Prince Albert, Emerson, St. John.
19. Stony Mountain, Hillview, Red Deer, Savanne, Clear Spring, Pembina Crossing, Norquay, Barker, ville, Battleford, Prince Albert, Banff, Qu'Appelle, Minnedosa, Winnipeg, Quebec.
20. Rosebank, Stratford, Durham, Barnardo, Haliburton, Saskatoon, Pipestone, Kneehill, Red Deer, Cannington Manor, Brandon, Griffin Lake, Clontarf, Port Hope, Bancroft, Point Clark, Lucknow, Glen Elm, Belmont, Didsbury, Kamloops, Banff, Port Arthur, White River, N. Sister Rock.
21. Montreal, Rosebank, Crane Lake, Lindsay, Durham, Truro, Fredericton, Point Lepreau, St. Stephen, Moncton, Sussex, Red Deer, Brome, Richmond, Nelson, Beatrice, St. Anne, Arden, Agincourt, Bancroft, Welland, Sunshine, Montague, Lansdowne, Scarborough, Emsdale, Gretna, Norquay, Bermuda, Battleford, Swift Current, Medicine Hat, Qu'Appelle, Winnipeg, Yarmouth, Grand Manan, Emerson, Oonikup, Barrie, St. John.

22. Crane Lake, Barnardo, Truro, Portage la Prairie, Treherne, Dutton, Gretna, Pembina Crossing, Elgin, Belmont, W. Beaver Hills, St. Johns, Swift Current, Medicine Hat, Qu'Appelle, Minnedosa, Port Arthur, Yarmouth, Grand Manan, Sable Island, Yarrow, St. John.

23. Aweme, Stony Mountain, Mosquito Creek, Chilliwack, Calgary, Nicola Lake, Savanne, Bancroft, Clear Spring, Selkirk, Norquay, Battleford, Medicine Hat, Minnedosa, Winnipeg, Emerson, Oonikup.

24. Crane Lake, Macleod, Mosquito Creek, N. Nicomen, Hazelmuere, Nelson, Tobacco Plains, Dutton, Langley, Abitibi, Battleford, Port Arthur, White River, N. Sister Rock, Yarrow, Moose Factory.

25. London, Lindsay, Coldwater, Durham, Woodstock, Moose Jaw, Agincourt, Paris, Welland, Providence Bay, Scarborough, Abitibi, Battleford, Medicine Hat, Toronto, N. Sister Rock, Barrie.

26. Rosebank, Owen Sound, Treherne, Red Deer, Meaford, Erasmus, Brantford, Belmont, Stony Creek, Sprucedale, Providence Bay, Midland, Emsdale, Pembina Crossing, Port Arthur, Parry Sound, N. Sister Rock, Oonikup.

27. Montreal, White-side, Stratford, Lindsay, Fredericton, St. Stephen, Portage la Prairie, Treherne, Brome, N. Nicomen, Hazelmuere, Bancroft, Arden, Scarborough, Georgetown, Oakland, Clear Spring, Norquay, Battleford, Winnipeg, Port Arthur, Quebec, Toronto.

28. Portage la Prairie, Norquay, Sydney.

29. Brome, Clontarf, St. Anns, Gosfield St., Ridgetown, Brantford, Paris, Lansdowne, Wooler, Scarborough, Dealtown, Norquay, Victoria, St. Johns, Port Stanley, Moose Factory.

30. Macleod, Moncton, Calgary, Knechtell, Griffin Lake, Tobacco Plains, Arden, Banff, Yarrow.

31. Rosebank, Barnardo, Picton, Portage la Prairie, Treherne, Gatesgarth, Nelson, Banff, Mount Stewart, Clear Spring, Selkirk, Minnedosa, Winnipeg, Yarrow.

Aurora recorded —

Where the class of aurora is noted by the observer, it is given, (I) being the brightest, (IV) the feeblest in brilliancy.

1. Aweme, II; Georgetown, IV; Treherne, Cannington Manor, IV; Bancroft, II; Meaford, IV; Savanne.

2. Pembina Crossing, IV; Red Deer, II.

3. Truro, II; Sydney, I.

4. Hillview, II; Pembina Crossing, II; Minnedosa, II.

6. Georgetown, IV.

7. Montreal, III; Pembina Crossing, II; Channel Island, IV; Meaford, IV; Savanne, Minnedosa, I.

8. Aweme, II.

9. Pembina Crossing, III; Savanne.

10. Georgetown, IV; Cape Magdalen, Red Deer, III; Savanne, Kingston, III; Quebec, IV.

15. Hillview, II; Banff, IV.

16. Hillview, II; Pembina Crossing, III; Channel Island, IV.

25. Pembina Crossing, II; Savanne.

26. Moose Jaw, Swift Current, IV.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE
THE HORIZON IN THE MONTH OF JULY, 1899.

	HOURS ENDING															
	6 A.M.	7 A.M.	8 A.M.	9 A.M.	10 A.M.	11 A.M.	NOON	1 P.M.	2 P.M.	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	8 P.M.	
VICTORIA	0.10	0.20	0.60	0.70	0.64	0.73	0.84	0.84	0.90	0.89	0.88	0.90	0.84	0.82	0.60	0.05
KUPER ISLAND																
AGASSIZ		0.03	0.18	0.54	0.62	0.42	0.65	0.67	0.72	0.67	0.68	0.67	0.64	0.57	0.22	0.00
BATTLEFORD	0.59	0.65	0.65	0.70	0.73	0.73	0.75	0.73	0.72	0.71	0.75	0.75	0.66	0.56	0.40	0.11
INDIAN HEAD		0.02	0.43	0.64	0.71	0.72	0.77	0.77	0.77	0.78	0.79	0.80	0.71	0.74	0.64	0.22
BRANDON																
WINNIPEG	0.22	0.62	0.75	0.74	0.72	0.74	0.74	0.75	0.80	0.79	0.73	0.63	0.63	0.61	0.58	0.14
DURHAM	0.00	0.02	0.28	0.41	0.40	0.47	0.58	0.63	0.71	0.68	0.70	0.66	0.69	0.65	0.37	0.08
WOODSTOCK	0.00	0.11	0.62	0.73	0.70	0.80	0.82	0.81	0.77	0.73	0.75	0.73	0.72	0.69	0.60	0.10
TORONTO	0.00	0.25	0.70	0.79	0.78	0.72	0.82	0.81	0.84	0.84	0.81	0.79	0.79	0.78	0.55	0.04
LINDSAY	S	0.30	0.42	0.67	0.77	0.75	0.73	0.72	0.74	0.72	0.75	0.74	0.64	0.38	0.37	0.22
BARRIE	0.65	0.31	0.61	0.65	0.69	0.70	0.70	0.74	0.71	0.80	0.76	0.69	0.71	0.68	0.34	0.09
KINGSTON	S	0.33	0.76	0.79	0.78	0.75	0.76	0.75	0.76	0.76	0.75	0.70	0.64	0.61	0.40	S
OTTAWA	0.31	0.59	0.69	0.74	0.74	0.74	0.75	0.77	0.77	0.74	0.60	0.54	0.44	0.44	0.37	0.00
MONTREAL	S	0.34	0.53	0.58	0.72	0.78	0.70	0.79	0.73	0.74	0.77	0.69	0.66	0.42	0.05	0.00
FREDERICTON	0.16	0.26	0.31	0.43	0.46	0.50	0.56	0.62	0.56	0.58	0.50	0.52	0.48	0.44	0.10	0.00

	VICTORIA.	KUPER ISLAND.	AGASSIZ.	BATTLEFORD.	INDIAN HEAD.	BRANDON.	WINNIPEG.	DURHAM.	WOODSTOCK.	TORONTO.	LINDSAY.	BARRIE.	KINGSTON.	OTTAWA.	MONTREAL.	FREDERICTON.
MEAN PROPORTION FOR MONTH..... (Constant sunshine being 1.)	0.67	.....	0.43	0.66	0.60	.....	0.64	0.47	0.64	0.68	0.60	0.60	0.63	0.58	0.63	0.43
DIFFERENCE FROM AVERAGE.....	+0.14	.....	+0.02	+0.09	-0.01	.....	-0.06	-	+0.06	+0.08	-0.03	-0.05	-0.06	-	+0.04	-0.05
MAXIMUM DAILY AMOUNT.....	0.83	.....	0.82	0.98	0.86	.....	0.92	0.88	0.93	0.91	0.99	0.90	0.90	0.88	0.98	0.93
DATE.....	11 13	.....	25	17	1	.....	30	30	24	30	31	28	31	31	24	28
NO. OF DAYS COMPLETELY CLOUDED	1	.....	7	0	0	.....	0	5	1	0	0	0	0	2	3	8

FORECASTS FOR JULY, 1899.

The forecasts issued by this office at 11 p.m. each night are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 929. These were divided as follows:—

DISTRICT.	No. ISSUED.	VERIFIED.			Percentage
		No. Fully	No. Partly	No. Not	
MANITOBA	91	69	25	6	79.7
LAKE SUPERIOR	103	74	19	10	81.1
LOWER LAKE REGION	116	87	17	12	82.8
GEORGIAN BAY.....	114	80	25	9	81.1
OTTAWA VALLEY.....	103	80	11	12	83.1
UPPER ST. LAWRENCE	102	75	19	8	82.8
LOWER ST. LAWRENCE.....	97	70	15	12	80.0
GULF	98	72	22	4	84.7
MARITIME PROVINCES	105	77	23	5	84.3
TOTAL	929	675	176	78	82.1

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by two and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent the predictions have been verified, the reports from the agents at all observing stations, as well as the telegraphic reports, are used.

R. F. STUPART,
Director.

Meteorological Office, Toronto,
26th August, 1899.

METEOROLOGICAL SERVICE, DOMINION OF CANADA.

Monthly Weather Review.

VOL. XXIII

AUGUST, 1899.

No. 8

INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraphic reports of observations received at this office for the purpose of weather forecasting, and reports by mail from voluntary observers and storm signal agents. For the material used in tracing the paths of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

REMARKS UPON THE WEATHER.

The weather of August was chiefly remarkable for the heavy rainfall and low temperature westward from Manitoba and the light rainfall and high mean temperature eastward from Lake Huron to the Atlantic Coast. These abnormal conditions were almost disastrous in some districts, the drought in Ontario doing much damage. Apart from its effect upon vegetation in Ontario and Quebec the weather was fine and enjoyable in Eastern Canada.

In British Columbia the weather was cool, cloudy and wet and altogether exceedingly unpleasant. In some districts thunderstorms were unusually frequent, and in the upper mainland snow fell upon several occasions on the mountain sides. Much damage to grain and other crops was caused by the wet weather.

Throughout the greater part of the North-west Territories the weather was much the same as in British Columbia, it being cool, cloudy and unusually wet. In some places the total rainfall was three times the average amount and the temperature was 7.0 below average at several stations. Light frost occurred in a few districts but caused no damage, nevertheless farm crops were backward and damage to grain before ripening by later frost was threatened.

The wet weather of the two last mentioned provinces did not extend to Manitoba the rainfall there being about normal; it was however somewhat cooler than usual and light frosts occurred at a few places. Harvesting of grain occurred on or about the 27th, and the farming community generally were jubilant over the condition of their crops.

In Ontario the weather was unusually fine, warm and dry, and although enjoyable it was almost disastrous to agricultural interests. In some the rainfall was only about one fourth of the average, and at three stations no rain fell during the month. Clear days with scorching sun prevailed in southern districts and vegetation had a blighted appearance. In districts contiguous to Lake Superior the rainfall, on the contrary, was well above average and vegetation was in good condition. Light frosts occurred in some places on or about the 14th.

In the Province of Quebec the weather was of much the same character as that in Ontario, it being fine warm and dry; the drought, however, was not so severe and plant life generally was in better condition. The maximum temperatures though exceeding 90° at two places were generally much lower than in Ontario, whilst the minimum temperatures were about the same.

The weather conditions in New Brunswick did not diverge much from the normal excepting in the rainfall, which was below average, and in the unusually large amount of bright sunshine; the drought however was nowhere very severe and the condition of vegetation in most districts was excellent. At a few places the mean temperature was somewhat below average.

In Nova Scotia there was much fine warm dry weather, and although the rainfall was considerably below average in some places the condition of grain and other crops was exceptionally favourable. No storms of much importance were reported and the only place at which many fogs occurred was Yarmouth.

The weather conditions of Prince Edward Island were much the same as in New Brunswick and were chiefly remarkable for the light rainfall which was recorded at some places; however the weather altogether did not differ much from the normal, and reports regarding the condition of vegetation were generally favourable. F. F. PAYNE.

ATMOSPHERIC PRESSURE.

Pressure was from average to a little above from the Lower Lake Region to Maritime Provinces, and elsewhere throughout Canada it was below average, especially so from the Rocky Mountains to Manitoba, where the deficiency ranged from .050 inches to .120 inches.

HIGH AREAS.

Five areas of high pressure were traced during the month as follows:—

No. 1 was a shallow high, which appeared over Manitoba on the 5th, and afterwards moved slowly over the Lower Lake Region to the Ottawa Valley, where it dispersed on the 9th. No. 2 was situated as a very shallow high on the British Columbian Coast on the 11th. It travelled rapidly eastward and reached Manitoba on the evening of the 12th. After leaving Manitoba the area became more important, and between the 13th and 17th it traversed Canada from the Lakes to the Atlantic, attended by very fine weather. No. 3 was situated in the Western States on the 24th, being apparently an offshoot of a high then existing in the North Pacific States. It passed between the 25th and 26th over the Lake Region and the St. Lawrence Valley to the Gulf. No. 4 was situated in Manitoba on the 27th, and then moved with rapidity over Canada to the Maritime Provinces, where it became united on the 28th with No. 3. The system then was centred in the Maritime Provinces until the 31st, the weather, meanwhile, remaining very fine from the Lakes to the Atlantic. No. 5 first appeared on the North Pacific Coast on the 27th. During the night of the 29th, it passed into the Northwest Territories. On the following night it was situated in Manitoba, and on the 31st it was centred to the northward of Lake Superior. This area was accompanied by local frosts in the Territories and Manitoba.

LOW AREAS.

Low pressure almost continuously covered the Territories, Manitoba and the greater portion of British Columbia, and although this low pressure was doubtless owing to a succession of shallow depressions, the courses of these depressions were so doubtful that they could not be accurately charted. Four lows were traced as follows:—

No. 1 was a shallow depression, which travelled between the 1st and 3rd from the Lake Superior district to the Upper St. Lawrence Valley, attended by general showers over Lake Superior, and scattered thunder-showers elsewhere. No. 2. From the 4th until the 8th, comparatively low pressure existed in the Territories and Manitoba, attended by numerous showers and thunderstorms in the former district, and scattered showers in the latter province. On the night of the 8th a more defined depression was situated in Alberta, and this depression passed slowly over the North-west, accompanied by frequent rains, and reached Lake Superior on the evening of the 11th. It afterwards moved more quickly far north over the country to the St. Lawrence Valley and the Gulf, giving showers generally, except in the Lower Lake Region, where they were only local. No. 3 was the West India hurricane, which caused such disaster in the West Indies between the 7th and 13th. After striking the Florida coast it moved unusually slowly up the Gulf Stream, and on the 19th apparently broke completely up when off the Hatteras coast. Its influence did not extend to any Canadian ports. No. 4 passed from the North-west Territories to the Lake Superior Region between the 19th and 20th, being seemingly augmented for a time by a subsidiary from the Western States. As the depression continued its easterly movement from Lake Superior, it decreased in energy, and after reaching the Upper St. Lawrence Valley on the 22nd, it dispersed. During its presence rain fell generally and heavily everywhere, except in the Lower Lake Region.

TEMPERATURE.

Temperature was below average from Vancouver Island to the Qu'Appelle Valley, and above average everywhere else in the Dominion except over Cape Breton and the Island of Anticosti, where it was from average to 1 below. In British Columbia and the North-west Territories it was very much below average, Kamloops reporting 8 below, and Banff and Calgary 6 below. On the other hand, many places in Ontario report the temperature as much as 5 above average, and in the Province of Quebec, Montreal was 3 above and Quebec City 2 above average.

The Highest and Lowest Temperature in each Province during August, 1899, were:

British Columbia,	90.0 on 5th at Midway.	29.0 on 29th at Midway.
"	90.0 on 6th at Griffin Lake.	
North-west Territories,	90.0 on 25th at Alameda.	27.5 on 30th at Duck Lake.
Manitoba,	92.0 on 25th at Aweme.	28.0 on 31st at Rosebank.
"	92.0 on 25th at Pipestone.	
Ontario,	101.0 on 20th at Stony Creek.	29.0 on 31st at Peterborough.
Quebec,	91.0 on 25th at Richmond.	33.0 on 15th at Bross.
New Brunswick,	91.0 on 19th at St. Stephen.	40.8 on 11th at Sussex.
Nova Scotia,	86.3 on 19th at Halifax.	40.0 on 11th at Sydney.
Prince Edward Island,	86.4 on 3rd at Charlottetown.	47.7 on 18th at Charlottetown.

PRECIPITATION.

The rainfall was above average from Vancouver Island to the Qu'Appelle Valley and also over the Lake Superior district, and below average throughout the large remaining portion of Canada. The excessive precipitation over British Columbia and the North-west Territories, was remarkable and more especially in the Territories where the average amount of precipitation is usually so small. Inuitail reports 12.25 inches, Didsbury, 7.4 inches, Calgary (2), 9.9 inches, Edmonton, 6.4 Kneeshill, 9.7 inches, Duck Lake, 7.2 inches, Red Deer, 9.7 inches, Musquito Creek, 7.9 inches, Calgary (1) reports 9.4 inches, nearly equal to the total average annual amount for that district. Edmonton reports 6.4 inches, Prince Albert 8.0 inches. It was also remarkable, considering the abnormal rainfall in the North-west Territories, that Manitoba should have had an amount less than the average when that in the Lake Superior district was also above average. Another remarkable feature in the rainfall distribution during the month was the drought over the Georgian Bay district, the Lower Lake region and the Ottawa Valley. Some few localities owing no doubt, to local thunderstorms, recorded over two inches of rain, but over the larger portion of these districts scarcely any rain fell, and some places reported none.

WINDS.

In British Columbia the westerly direction prevailed on seventeen days and the easterly on seven. On sixteen days fresh breezes were experienced and on three days the winds were strong. In the North-west Territories no one direction predominated, there was however a considerable wind mileage generally. On thirteen days fresh breezes were recorded and on four occasions strong breezes to gales were experienced. In Manitoba the westerly direction prevailed on eleven days and the easterly on thirteen, there were eleven days of fresh breezes and seven days of strong winds. In the Lake Region light to moderate variable winds were prevalent and on only two occasions was the force of a strong breeze generally attained. In the St. Lawrence Valley the winds were westerly on sixteen days and easterly on six, there were fourteen days of fresh breezes, five of strong and on the 14th, the force of a gale was reached in the Gulf. In the Maritime Provinces the westerly direction predominated but the wind force seldom exceeded that of a moderate breeze, and on no occasion was a strong breeze experienced except very locally.

BRIGHT SUNSHINE.

Bright Sunshine was above the average in Ontario, Quebec and the Maritime Provinces and below average from Vancouver Island to Manitoba. The largest amounts registered was at Barrie and Lindsay where it was 65 per cent of the possible and the smallest amount was at Agassiz, B. C. where it was but 22 per cent of the possible.

[illegible]

PRECIPITATION AT STATIONS REPORTING RAIN, WEATHER, &c., DURING AUGUST, 1899.

STATIONS.	RAINFALL.				Thunder or Lightning, &c.	REMARKS.
	Amount inches.	Days of Rain Occur.	No. of Fair Days.	Heaviest Fall in Month.	Date.	
BRITISH COLUMBIA.						
Goldstream Lake	2.42	8	23	0.61	9	
Langley	4.56	11	20	1.12	15	
Albion	2.49	12	19	0.55	26	1, 5, 19.
Royal Oak	1.89	12	19	0.53	15	
Nanaimo	1.77	6	25	0.75	16	
Cumberland	3.94	10	19	1.02	10	
N. W. TERRITORIES.						
West Beaver Hills	0.43	20	10	1.72	14	4, 5, 6, 7, 8, 9, 16, 18, 24.
Imperial	0.25	20	11	2.32	15	
Stirling	4.54	4	27	2.30	8	
Edmonton	2.15	5	26	1.00	15	6.
Saltreeds	5.22	5	26	1.40	19	
Dundbury	7.38	18	13	1.28	14	
Rouleau	2.65	10	21	1.01	6	5, 25.
Courts	2.63	9	22	0.60	7	7.
MONTANA.						
Hartney	2.42	9	22	0.93	8	
Elgin	1.59	15	16	0.42	16	1, 7, 9, 16, 19, 22, 25, 28.
Oakbank	1.45	6	10	0.88	8	
Grohn	1.40	4	26	0.80	8	
Selkirk	1.91	8	23	0.94	8	8, 15.
Cattwright H.	4.15	10	21	2.59	7	7, 15, 22.
Morlon	1.29	3	25	1.20	7	
Greenwood	2.46	4	27	1.43	7	
Pembina Crossing	5.07	7	21	3.97	7	2, 5, 7, 9, 10, 14, 15, 16, 19, 22, 25, 28, 29.
Norway	2.47	13	17	0.72	20	1, 3, 10, 11, 16, 19, 20, 21.
Bellevue	1.70	9	22	0.72	7	9, 10, 16, 19, 22, 26, 28.
Cattwright 12	1.48	7	23	0.45	16	16, 24.
Clear Spring	1.63	4	23	0.76	8	9, 16, 22, 28, 29.
Sheep Lake	0.80	2	29	0.50	3	
Beaver Creek	2.74	6	25	1.07	7	
ONTARIO.						
Georgetown	0.74	2	29	0.70	12	
Georgetown	0.53	1	27	0.18	10	3, 4, 9, 10, 11, 12, 26.
Aurora	0.17	1	29	0.17	9	
South's Falls	2.21	4	27	1.30	21	
Weymouth	1.15	2	27	0.95	11	9.
Dutton	0.56	2	29	0.32	11	19, 11, 31.
Coldstream	0.70	2	29	0.53	11	11.
Pineburgshere	0.80	8	23	0.58	12	12.
Huntsville	0.84	4	27	0.50	1	12, 21.
Wooler	0.38	2	29	0.28	12	2, 12, 21, 27.
Lansdowne	0.00	0	31			4, 21.
Coxdon	0.75	3	28	0.30	2	2, 22.
Farmington	1.05	3	28	0.72	22	22.
Madford	0.67	4	27	0.40	11	1, 11.
Scarboro	0.16	2	26	0.15	19	2, 11.
Watford	0.53	2	29	0.25	5	
Emmashore	0.60	2	29	0.40	2	
Elgin	1.40	5	26	0.77	21	
Thompson	2.87	6	25	0.92	2	20, 21, 30.
Uxbridge	2.05	3	27	1.45	31	
Beaumont	0.47	3	28	0.22	3	
Provincetown Bay	0.82	4	27	0.57	1	1, 19, 31.
Spartan Lake	0.68	4	27	0.29	2	
Ardon	1.17	7	24	0.71	22	12, 13, 22.
Nottawasaga Island	0.08	1	30	0.08	11	11.
Emisdale	0.84	6	24	0.34	21	2, 12, 21.
Simsbury	0.25	2	29	0.16	10	
Port Burwell	0.29	3	28	0.12	26	
Rollins Mills	1.20	3	28	0.55	2	
X. Williamsburg	2.31	5	26	1.00	23	
Jermyn	0.95	2	29	0.63	2	11, 12, 23, 27.
Moetagne	1.79	3	28	0.95	21	
Deer Park	0.21	2	29	0.18	10	
Lanedoche	0.70	1	30	0.70	26	
Cherry Valley	0.36	2	29	0.25	21	21.
Ursa	2.28	6	25	0.96	21	11, 21.
Leon's Head	0.68	2	29	0.33	10	10.
Willow Grove	0.58	3	29	0.25	10	10.
Oliver's Ferry	1.55	5	26	0.65	22	
Pineaston	0.07	1	30	0.07	11	11.
Orangeville	0.47	2	29	0.36	10	
Wharton	0.77	3	28	0.57	14	14.
NEW BRUNSWICK.						
Pom. Esplanade	0.60	5	26	0.37	14	13.
NOVA SCOTIA.						
Port Morden	1.76	6	25	0.79	26	
P. E. ISLAND.						
Murray River	1.98	8	23	0.95	13	13.
Mount Stewart	0.72	3	28	0.36	24	

Thunder recorded on—

1. N. Sister Rock, Pipestone, Moose Jaw, Cockburn Island, Cannington Manor, Muskow-petung, Montreal, Providence Bay, Elgin.
2. Montreal, Kinnmount, Beatrice, Baneroff, Erasmus, Agincourt, Paris, Otonabee, Port Dover, Knee Hill, Whiteside, Duck Lake, Port Hope, Sprucedale, Emsdale, Sparrow Lake, Parry Sound, Kingston, Sydney, Gravenhurst, London, Deseronto, Guelph, Lindsay, Searboro, Croydon, Wooler, Pembina Crossing, Brome, Peterboro'.
3. Gosfield S., Ridgetown, Arden, Quebec.
4. Calgary, Agincourt, Red Deer, Welland, Lansdowne, Cape Magdalen, Quebec, Father Point, Haileybury.
5. Chicoutimi, Cape Chatte, Red Deer, Knee Hill, W. Beaver Hills, Alberni, Dalhousie, Nelson, Mesquite Creek, Calgary, Quebec, Father Point.
6. Moose Jaw, Calgary, Red Deer, Crane Lake, Duck Lake, Estevan, Dirt Hill, Tobacco Plains, Macleod, Kamloops, Medicine Hat, Swift Current, Regina.
7. Picton, Portage la Prairie, Gagesgarth, Calgary, Duck Lake, Coutts, Pembina Crossing, Elgin, Barnardo, Battleford, Regina.
8. Gagesgarth, Muskowpetung, Red Deer, Duck Lake, W. Beaver Hills, Selkirk, Tobacco Plains, Macleod, Medicine Hat, Swift Current, Bermuda, Regina.
9. Moose Jaw, Calgary, Cannington Manor, Muskowpetung, Red Deer, Knee Hill, Hamilton, Duck Lake, W. Beaver Hills, Clear Spring, Wyoming, Belmont, Elgin, Bismar, Medicine Hat, Battleford, Qu'Appelle, Minnedosa, Swift Current, Sydney.
10. St. Ann's, Point Clark, N. Nicomen, Calgary, Red Deer, Gosfield S., Welland, Knee Hill, Wilton Grove, Lion's Head, Dutton, Belmont, Pembina Crossing, Treherne, Stony Mountain, Barnard, Medicine Hat, Winnipeg, Port Stanley, London, Regina.
11. Savanne, Point Clark, Cockburn Island, French Creek, Erasmus, Croydon, Darton, Welland, Port Hope, Owen Sound, Princeton, Ursa, Jernyn, Searboro, Macleod, Coalbrook, Medicine Hat, White River, Port Arthur, Port Stanley, Bermuda, Lindsay, Bismar, Peterboro, Woodstock, Stony Mountain.
12. Montreal, Kinnmount, Beatrice, N. Nicomen, Baneroff, Agincourt, Welland, Macleod, Haliburton, Whiteside, Port Hope, Sprucedale, Arden, Jernyn, Wooler, Huntsville, Brome, Portage la Prairie, Peterboro, St. Agathe, Rivers Inlet, Clearwater, Parry Sound, Quebec, Gravenhurst, Deseronto, Durham, Lindsay, Haileybury.
13. Calgary, Collingwood, Perce, Arden, Point Esquimaux, Murray River, Fredericton, Kamloops, Medicine Hat, Banf, Prince Albert, Quebec, Father Point.
14. Picton, Red Deer, Knee Hill, Wharton, Parrsboro, Truro, Charlottetown, Bermuda.
15. Knee Hill, Selkirk, Awenue, Treherne, Battleford, Swift Current, Onikup.
16. Brandon, Portage la Prairie, Muskowpetung, Perce, Clear Spring, Belmont, Pembina Crossing, Elgin, Rosebank, Treherne, Stony Mountain, Minnedosa, Charlottetown.
17. N. Sister Rock.
18. N. Sister Rock, Pika Bay, Moose Jaw, W. Beaver Hills, Nelson, Treherne.
19. Cockburn Island, Moose Jaw, Brandon, Portage la Prairie, Calgary, Muskowpetung, Providence Bay, Belmont, Pembina Crossing, Elgin, Barnardo, Qu'Appelle, Winnipeg, Minnedosa, Onikup, Regina.
20. N. Sister Rock, Cockburn Island, Wolfville, Thompson, White River, Halifax, St. John, Regina, Haileybury.
21. Montreal, Kinnmount, Pipestone, Beatrice, Baneroff, Otonabee, Welland, Macleod, Wooler, Haliburton, Crane Lake, Port Hope, Ursa, Cherry Valley, Robblins Mills, Emsdale, Huntsville, White River, Bissett, Kingston, Lindsay, Haileybury.
22. Montreal, Moose Jaw, Hillview, Brandon, Arden, Parma, Lansdowne, Clear Spring, Belmont, Elgin, Brome, Awenue, Treherne, Medicine Hat, Minnedosa, Quebec, Yarmouth, Onikup.
23. Jernyn, Brome, Battleford, Yarmouth, Grand Manan.
24. Red Deer, Gosfield S., Ridgetown, W. Beaver Hills, Treherne, Prince Albert, Swift Current, Bermuda.
25. Pipestone, Moose Jaw, Hillview, Dirt Hill, Elgin, Brome, Barnardo, Medicine Hat, Swift Current, Quebec.
26. St. Ann's, Savanne, French Creek, Portage la Prairie, Gosfield S., Otonabee, Welland, Belmont, Minnedosa, Bermuda.
27. Stony Creek, Duck Lake, Jernyn, Wooler, Port Arthur, Port Stanley, Yarmouth.
28. Wolfville, Clear Spring, Belmont, Pembina Crossing, Rosebank, Parrsboro, Truro, Stony Mountain, Port Arthur.
29. Brandon, Muskowpetung, Minnedosa, White River, Port Arthur.
30. Thompson, White River.
31. Hazlemere, N. Nicomen, Agincourt, Providence Bay, Quebec, Onikup.

Aspera Rossii

Where the class of colour is noted (1), the deeper, it is given; (I) or II, the brightest, IV, the palest in the series.

1. Cape Magdalen, Cape Chatte, II; Quebec, IV.
2. Gatesgarth, Georgetown, IV; Aweme, II.
3. Meaford, IV; Haileybury, III; Red Deer, II; Gatesgarth, *jun*; Hillview, I; Clontarf, IV; Cockburn Island, Savanne, Pembina Crossing, III; Scarborough, Aweme, II; Channel Island, IV; St. Agathe.
4. Erasmus, Hillview, II; Savanne, Pembina Crossing IV; Aweme, III; Minnedosa, I; Gravenhurst, II; Haileybury, IV.
5. Erasmus, Cockburn Island, Savanne, Chicoutimi, Georgetown, IV; Minnedosa, I; Haileybury, IV.
6. Channel Island, IV; St. Agathe, Father Point, Haileybury.
7. Truro, IV; Swift Current, IV.
8. Aweme, III.
9. Aweme, IV; Father Point, Gravenhurst, IV.
10. Point Rich.
12. Meaford, IV; Georgetown, IV; Midland, II.
13. Hillview, IV; Pembina Crossing, IV; Georgetown, III; W. Beaver Hills, IV; Medicine Hat, IV; Qu'Appelle, IV; Quebec, IV; Haileybury, IV.
14. St. Agathe.
16. Portage la Prairie, Channel Island, IV; Haileybury, IV.
17. Moose Jaw, Pembina Crossing, IV.
18. Pembina Crossing, IV.
20. Aweme, II; St. Agathe, Barnardo, IV.
21. Quebec, IV.
27. Cape Magdalen, Chicoutimi, Medicine Hat, III; Quebec, IV.
28. Gatesgarth, Hillview, IV; Barnardo, IV.
29. Red Deer, II; Gatesgarth, Moose Jaw, Sussex, Pembina Crossing IV; Georgetown, IV; West Beaver Hills, III; Aweme, III; Truro, IV; Barnardo, III; Medicine Hat, III; Prince Albert, III.
30. Duck Lake, IV; Portage la Portage, Hillview, I; Savanne, Cape Chatte, III; Sussex, Pembina Crossing, III; Aweme, II; Channel Island, IV; Truro, IV; St. Agathe, Barnardo, II; Minnedosa, I; Father Point.
31. Duck Lake, II; Savanne, Cape Chatte, II; Channel Island, IV; Barnardo, III; Minnedosa, I.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE
THE HORIZON IN THE MONTH OF AUGUST, 1899.

	HOURS ENDING															
	5	6	7	8	9	10	11	1	2	3	4	5	6	7	8	
	A.M.	A.M.	A.M.	A.M.	A.M.	A.M.	A.M. NOON.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	
VICTORIA	0.00	S	0.21	0.55	0.58	0.32	0.53	0.54	0.51	0.77	0.55	0.65	0.50	0.50	0.15	0.00
KUPER ISLAND. ....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
AGASSIZ.	0.00	0.00	0.11	0.14	0.18	0.24	0.28	0.25	0.20	0.2	0.55	0.39	0.32	0.19	0.4	0.00
BATTLEFORD.	0.17	0.44	0.47	0.49	0.46	0.5	0.50	0.73	0.50	0.55	0.54	0.51	0.47	0.35	0.08	0.00
INDIAN HEAD.	0.00	0.00	0.05	0.37	0.57	0.65	0.65	0.70	0.60	0.67	0.63	0.73	0.65	0.37	0.11	0.01
BRANDON.	0.00	0.11	0.47	0.52	0.71	0.72	0.63	0.71	0.62	0.57	0.71	0.51	0.50	0.44	0.27	0.00
WINNIPEG.	S	0.24	0.50	0.50	0.63	0.67	0.57	0.75	0.77	0.77	0.71	0.59	0.66	0.53	0.25	S
DURHAM.	0.00	0.00	0.18	0.52	0.67	0.50	0.67	0.60	0.72	0.70	0.78	0.79	0.61	0.56	0.31	0.00
WOODSTOCK.	0.09	0.5	0.34	0.37	0.58	0.73	0.82	0.80	0.80	0.78	0.77	0.71	0.71	0.63	0.17	0.00
TORONTO.	0.00	0.00	0.36	0.56	0.78	0.8	0.73	0.77	0.70	0.65	0.74	0.75	0.60	0.56	0.25	0.00
LINDSAY.	0.00	0.12	0.19	0.78	0.70	0.76	0.78	0.77	0.77	0.70	0.75	0.77	0.70	0.65	0.74	0.08
BARRIE.	0.00	0.00	0.02	0.71	0.77	0.84	0.84	0.83	0.8	0.78	0.80	0.76	0.64	0.58	0.07	0.00
KINGSTON.	0.00	0	0.28	0.70	0.70	0.77	0.77	0.60	0.70	0.77	0.75	0.77	0.68	0.54	0.00	0.00
OTTAWA.	0.00	0.16	0.2	0.62	0.70	0.70	0.75	0.82	0.75	0.76	0.78	0.77	0.67	0.58	0.15	0.00
MONTREAL.	0.00	0.13	0.42	0.73	0.70	0.71	0.70	0.71	0.77	0.80	0.77	0.72	0.50	0.24	0.00	0.00
FREDERICTON.	0.10	0.40	0.55	0.70	0.78	0.70	0.75	0.82	0.8	0.75	0.70	0.65	0.54	0.20	S	0.00

	VICTORIA.	KUPER ISLAND.	AGASSIZ.	BATTLEFORD.	INDIAN HEAD.	BRANDON.	WINNIPEG.	DURHAM.	WOODSTOCK.	TORONTO.	LINDSAY.	BARRIE.	KINGSTON.	OTTAWA.	MONTREAL.	FREDERICTON.
MEAN PROPORTION FOR MONTH..... (Constant sunshine being 1.)	0.42	...	0.22	0.46	0.48	0.51	0.58	0.55	0.71	0.61	0.65	0.65	0.58	0.62	0.64	0.50
DIFFERENCE FROM AVERAGE.....	-0.10	...	-0.26	-0.12	-0.03	-0.10	0.2	-	-0.07	-0.07	-0.12	-0.14	-0.01	-	-0.06	-0.10
MAXIMUM DAILY AMOUNT.....	0.85	.....	0.72	0.95	0.80	0.98	0.96	0.80	0.90	0.86	0.98	0.89	0.86	0.89	0.98	0.94
DATE	8-20	.....	2	28	4	26	25	18	6	6	17	15	9	16	16	14
NO. OF DAYS COMPLETELY CLOUDED.....	1	.....	15	3	2	4	2	4	1	0	1	0	0	0	0	3

FORECASTS FOR AUGUST, 1899.

The forecasts issued by this office at 11 p.m. each night are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 1000. These were divided as follows:—

DISTRICT.	No. Issued.	VERIFIED.			
		No. Fully	No. Partly	No. Not	Percentage
MANITOBA	30	80	10	9	85.9
LAKE SUPERIOR	111	90	18	3	89.2
LOWER LAKE REGION	115	107	8	0	96.5
GEORGIAN BAY	113	107	5	1	95.1
OTTAWA VALLEY	105	97	5	3	94.8
UPPER ST. LAWRENCE	105	97	6	4	93.3
LOWER ST. LAWRENCE	112	112	7	3	94.2
GULF	120	106	12	2	90.3
MARITIME PROVINCES	120	102	17	1	92.1
TOTAL	1000	884	88	28	92.8

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by two and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent the predictions have been verified, the reports from the agents at all observing stations, as well as the telegraphic reports, are used.

The forecasts and storm warnings were issued by Forecast Officer, R. C. Webber.

ABSTRACT of Observations at Fort Good Hope, Mackenzie River, Lat 66° 20' N. Long. 128° 25' W. From March, 1898, to 30th June, 1899, by the Rev. R. P. Seguin.

	TEMPERATURE.					WIND DIRECTION FROM								RAIN.		SNOW.		Gales.	Fogs.	Fair Days.		
	7 a.m.	2 p.m.	9 p.m.	Mean.	Max.	Min.	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	C.	Amt.	dys.				Amt.	dys.
March, 1898	-13	-18	-14	-18	-6.0	-2.0	11	19	16	7	0	0	16	21	0	0.09	0	13.6	5	4	5	26
April	-11	-9	-22	-18	-6.0	-2.0	12	5	6	5	0	2	39	21	0	0.00	0	16.8	7	1	0	23
May	-5	-15	-8	-11	-9.6	-3.0	5	7	0	12	0	0	27	11	0	0.65	1	8.8	6	2	1	20
June	-1	-6	-5	-4	-7.0	-2.0	5	21	4	11	0	7	6	22	0	0.25	1	...	...	0	0	...
July	-2	-6	-8	-7	-7.0	-2.0	13	8	6	8	0	7	14	40	0	0.00	2	...	...	2	1	...
August	-1	-12	-3	-6	-7.0	-2.0	17	22	0	3	0	3	14	51	0	0.29	3	...	...	5	2	...
September	-3	-14	-1	-9.6	-6.0	-1.0	15	25	1	5	0	0	26	0	0	0.25	3	...	...	0	0	...
October	-6	-19	-6	-11.6	-3.0	-7.0	17	16	28	0	0	0	9	7	0	0.00	0	6.8	4	0	1	33
November	-10	-22	-24	-21.3	-7.0	-2.0	15	1	37	0	0	0	27	7	0	0.00	0	7.7	4	0	0	15
December	-10	-21	-21	-22	-3.0	-17.0	17	15	31	5	0	0	18	9	0	0.00	0	16.5	6	0	1	25
January, 1899	-10	-20	-6	-11.6	-12	-36.0	5	0	38	0	0	0	32	11	0	0.06	0	12.0	5	5	16	35
February	-11	-11	-2	-4.6	-15.0	-29.0	0	11	64	0	0	0	19	0	0	0.00	0	3.6	3	0	4	31
March	-11	-12	-3	-2.4	-23	-2.0	0	3	14	2	0	0	1	34	0	0.00	0	23.3	7	2	7	24
April	-2	-8	-5	-5	-1.0	-29.0	1	29	6	6	0	10	14	0	0	0.00	0	13.8	9	0	0	21
May	-1	-19	-4	-3.6	-10.0	-1.0	28	17	14	7	0	0	20	4	0	0	0	0	0	0	0	24
June	-6	-10	-2	-2.6	-7.0	-24.0	26	5	6	12	0	0	26	15	0	0.57	4	...	...	2	0	24

The Maximum and Minimum Temperature are from the readings of the ordinary Thermometer at Observation hours.

R. F. STUPART,

Director.

Meteorological Office, Toronto,
26th September, 1899.

METEOROLOGICAL SERVICE, DOMINION OF CANADA.

Monthly Weather Review.

VOL. XXIII

SEPTEMBER, 1899.

No. 9

INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather forecasting, and reports by mail from voluntary observers and storm signal agents. For the material used in tracing the paths of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

REMARKS UPON THE WEATHER.

The weather in Canada during September was chiefly remarkable for the exceptionally bright warm weather which prevailed throughout the greater portion of British Columbia and the North-west Territories, also the cool weather with much cloud and heavy rainfall in Ontario. Elsewhere the weather did not differ much from normal.

In the Province of British Columbia the weather was unusually fine and warm the temperature being well above average in most places and the rainfall generally below. The ripening of grain, so much retarded by the cool wet weather of August, made rapid progress, and losses expected were fortunately not realized.

The weather conditions in the North-west Territories were even more favourable than in the last named province it being exceptionally fine and warm, whilst the rainfall was about average. The maximum temperatures which occurred at most places on or about the 25th, were generally well above 80°. Frosts were reported from all stations and at some places they were severe, nevertheless little damage appears to have been caused thereby.

In Manitoba the weather did not differ much from normal excepting in the amount of bright sunshine which at most places was unusually large; in the eastern portion however it was somewhat cooler than usual and at most places the rainfall was below average. The lowest temperature occurred nearly everywhere on the 29th, and 14° was recorded at Rosebank on that date. By the 30th vegetation had quite a wintry appearance.

In Ontario the weather was for the most part exceptionally cold, cloudy, and wet, more especially during the latter half of the month. Nearly everywhere the temperature was well below average and although the departure in the rainfall above average was only important in northern and eastern districts it was almost general. The maximum temperatures which were at most places between 80° and 90° exceeded the latter figure at a few stations. The frosts which occurred were unusually frequent and early, and in some districts were severe. These repeated frosts quickly showed their effect upon vegetation the trees taking on their autumnal tints, very early. Snow fell at many places during the last few days of the month, a depth of four inches being reported from London on the 30th.

The weather in the province of Quebec did not differ much from the normal excepting in a few districts; on the whole however it was somewhat cooler and more cloudy than usual, more especially during the latter half of the month. The maximum temperatures recorded only reached 80° at two stations, whilst the minimum temperatures were in many instances higher than in Ontario, 41° being the minimum at South-west Point Anticosti and 36° at Montreal. The trees changed colour towards the end of the month.

In New Brunswick the weather was almost normal, the rainfall however was somewhat below average at most places and in the vicinity of Moncton it was exceptionally dry. The maximum temperatures at most places were 80° or a little below and the minimum temperatures reported were from 42° at Grand Manan to 29.5 at Sussex. The only gale recorded occurred on the 6th, when the wind registered 48 miles per hour at St. John.

In Nova Scotia the departures from normal were not important; it was however somewhat warmer than usual in most districts and at the larger number of stations the rainfall was above average. At most places the maximum temperatures were between 70° and 75°, and the minimum temperatures between 18° at Sable Island and 28° at Parrsboro. Most trees were still quite green at the end of the month. A strong gale from the west and northwest occurred on the 6th and 7th.

In Prince Edward Island the weather took much the same character as that in New Brunswick, the conditions being almost normal. Light frosts occurred at most places but vegetation was comparatively green on the 30th. Some considerable damage was done along the coast by a heavy gale which occurred on the 7th.—F. F. PAYNE.

ATMOSPHERIC PRESSURE.

The mean pressure was considerably above average from the Pacific Coast to the Upper Lake Region average or a little above in the Maritime Provinces, and average or a little below in Ontario and Quebec. The greatest amount above average was in Assiniboia 0.12 of an inch, and the largest amount below was at Montreal, 0.05 of an inch.

HIGH AREAS.

No. 1, which had first appeared on the North Pacific coast on the 27th of last month, was on the 1st September centred in Northern Quebec whence it moved to the Gulf of St. Lawrence and then south over the Atlantic. No. 2 developed over Alberta on the 2nd, moved eastward to Lake Superior, then south east to the New England coast and out to sea on the 5th. It was not a very pronounced area, but brought fine weather everywhere. No. 3 also first developed over Alberta on the 4th, moved to Western Quebec and then southward and off the middle Atlantic coast on the 7th. No. 4, after hovering on and off the British Columbian and adjoining States coasts from the 6th until the 11th, moved to the North-west Territories, then to the Lakes where it divided in two on the 14th, but reunited again on the 16th. It was an extensive area and brought fine weather throughout the country. No. 5 was an offshoot of the last area from which it parted on the 8th over Dakota; it passed eastward reaching Newfoundland on the 11th. No. 6 was comparatively unimportant: it first appeared over Northern British Columbia on the 15th, and moved south-eastward for a time, but was absorbed by No. 7 on the 17th when nearing the Lakes. No. 7 first appeared over British Columbia on the 17th, and thence moved to the North-west where it attained some energy, but soon passed to Northern Quebec, and apparently dispersed there. No. 8 was first noticed over Saskatchewan on the 20th. It was unimportant and of little energy, and took a south-east course to the Maritime Provinces, passing off the coast on the 24th, and causing cold weather throughout its course. No. 9 was an unimportant high, which first took definite form over Kansas and seems to have been absorbed by No. 8 on the 23rd, when nearing the Middle Atlantic Coast. No. 10, after hovering some time off the British Columbian and adjoining States coasts, was centred over Washington Territory on the 24th, from whence it took an erratic course more or less south-easterly until reaching the Carolina Coast, when it moved north-eastward up the Gulf Stream and out to sea. No. 11 first appeared over Northern British Columbia on the 27th, moved quickly south-eastward to Wyoming, then eastward to the Lakes being centred near Lake Michigan on the night of the 30th; it was of slight proportions at first, but soon developed into an area of importance and large proportions, covering at the end of the month the whole territory from Hudson's Bay south to the Gulf of Mexico and extending from Manitoba in the west to the Atlantic seaboard in the east.

LOW AREAS.

September was not a stormy month, although the low areas were numerous. In three cases areas moved up the middle Atlantic Coast, and two came from the Middle Mississippi Valley, but by far the greater number crossed the North west and passed eastward across the continent. The mean velocity with which the low areas travelled was 31.0 miles per hour. No. 1 first appeared over British Columbia on the night of August 30th, and on the 1st September was centred over Montana, whence it moved to Manitoba, and then east to Newfoundland, which it reached on the 4th, and for the most part was unimportant until it passed over the Gulf of St. Lawrence where it gave a moderate to fresh gale. No. 2 was also first seen over British Columbia on the 2nd, moved into Montana and then to the North-west, where it was joined on the 4th by No. 3. This latter area was on the 2nd near California, and moved quickly northward; the combined system then passing due eastward to Newfoundland, which it reached on the 6th. It was of moderate energy until it arrived at the Gulf of St. Lawrence, where it developed considerably and gave a fresh gale. No. 4 was at first noticed on the morning of the 4th, as centred over Arizona, from whence it moved north-eastward and may have been absorbed by No. 5, but its actual movement is uncertain. No. 5 was passing over British Columbia on the 4th, soon crossed to the North-west and thence moved eastward, reaching Newfoundland on the 8th, and showed little energy throughout. No. 6 was an area of slight importance, which first appeared over Alberta on the night of the 8th, and passed east to the north of Lake Superior where it apparently dispersed. No. 7, which seems to have been subsidiary to No. 6, was apparently centred over Saskatchewan on the night of the 10th; whence it took a south-easterly course to the Ottawa Valley and then north-east to the Gulf of St. Lawrence, eventually crossing Newfoundland on the 15th. It was a shallow depression until it reached the Lakes, where it caused fresh to strong winds and local showers, also giving showery weather in the eastern provinces. No. 8 was short lived and of little importance. It first appeared near Cape Hatteras on the night of the 11th, disappearing during the 12th off the New England Coast. No. 9 was an unimportant low, which after causing some showers in Alberta on the 13th passed southward and disappeared. No. 10 was quite unimportant,

arriving over Alberta on the 15th, it apparently moved to Lake Superior and then eastward, dispersing over Northern Quebec. No. 11 was a small shallow trough of low pressure, which first appeared over Missouri on the 17th, and soon extended to the Lower Lakes and St. Lawrence Valley where it caused a general rainfall. No. 12, which first appeared in the eastern portion of the Gulf of Mexico, moved quickly up the coast, crossing the Maritime Provinces on the 20th. It was unimportant as far as wind is concerned, but was accompanied by an excessive fall of rain, both along the Atlantic coast and throughout the Maritime Provinces. No. 13 was quite unimportant. It first appeared over Alberta on the 21st, passed eastward and dispersed near James Bay. No. 14 was first noticed as centred in Iowa on the 24th. It soon crossed the Lower Lakes causing strong winds and moderate gales accompanied by heavy rainfall there. After passing the Lakes it was joined by No. 15 on the 26th, which had first appeared over North Carolina the day before. No. 16 was the most important area of the month and was situated over Northern Alberta on the 25th, whence it took a south-easterly course to Lake Superior and on the 28th covered the whole of the Lakes and had developed into an important storm. It caused a fresh to strong gale throughout the North-west, Manitoba and the Lakes. On the 29th it quickly diminished in energy and passed as an unimportant area eastward, reaching the Gulf of St. Lawrence on the 30th.

WINDS.

In British Columbia southwesterly winds were the most prevalent, and whilst on several days fresh winds occurred there were no gales. In the North-west Territories, the general direction was westerly. No gales were recorded, although on several days strong winds prevailed. In Manitoba, the winds were mostly westerly; two gales occurred, one on the 27th, reaching the force of a strong gale. One gale occurred on Lake Superior, otherwise the winds were for the most part moderate to fresh, and no special direction of wind was marked. In the Lake Region generally, north and west winds were most prevalent; the force of a gale was reached on four occasions; but in two of these the gales were only local. In the Ottawa and St. Lawrence Valleys the winds were generally moderate to fresh, no gales being recorded; whilst the westerly winds were most in evidence. In the Gulf of St. Lawrence the westerly winds predominated. There was one gale which was general throughout the Gulf and on three occasions the force of a gale was reached locally. In the Maritime Provinces the most prevalent winds were from a westerly direction, and whilst they were not as a rule strong, the force of a gale was reached locally on three occasions. One local gale was not warned for the Maritime Provinces; all the others were warned, but for one gale in the Gulf the warning was late at many stations.

TEMPERATURE.

The temperature was above average from Vancouver Island to Manitoba, nearly average in Eastern Quebec and the greater portion of the Maritime Provinces, and below average over Ontario and Western Quebec, and especially so in the more northern portions. White River was as much as 7° below, Bissett 5° below, and Montreal 4° below. Alberta and the North Saskatchewan Valley show the greatest amount above average, amounting to 3°.

The Highest and Lowest Temperature in each Province during September, 1899, were:

British Columbia,	90° 0 on 15th at Agassiz.	29° 5 on 28th at Revelstoke.
North-west Territories,	88° 0 on 1st at Alameda.	20° 0 on 18th at Moose Jaw.
Manitoba,	88° 5 on 1st at Aweme.	14° 0 on 29th at Rosebank.
Ontario,	95° 0 on 7th at Cottam and Gosfield.	8° 0 on 30th at Savanne.
Quebec,	85° 0 on 1st at Richmond.	23° 0 on 24th at Richmond.
New Brunswick,	80° 0 on 18th at Chatham.	20° 5 on 24th at Sussex.
Nova Scotia,	78° 0 on 4th at Port Hastings.	28° 8 on 24th at Parrsboro.
Prince Edward Island,	76° 6 on 18th at Charlottetown.	33° 0 on 24th at Hamilton.

PRECIPITATION.

The rainfall was largely above average over the middle and eastern portions of Ontario and in Western Quebec, below average in western and south-western Ontario, and also generally below over British Columbia. In the other portions of the Dominion it did not differ much from the average amount, except locally; it was however, for the most part, a little below average in Eastern Quebec, the Maritime Provinces, Southern Manitoba and the Qu'Appelle Valley, and above average in the North Saskatchewan Valley. At Toronto the average amount was exceeded by 1.9 inches, at Ottawa by 2.4 inches, at Welland by 3.4 inches and at Haliburton by 3.8 inches, Montreal was 1.8 inches above average, and Quebec 0.6 inches below average.

BRIGHT SUNSHINE.

Bright sunshine exceeded the mean amount from Vancouver Island to Manitoba both inclusive, and a deficiency was recorded over the remaining portion of the Dominion; the percentage of the possible duration ranged from 62 in Victoria, B.C., 60 at Battleford and 53 at Winnipeg to between 33 and 42 in Ontario and to between 43 and 48 in Quebec and the Maritime Provinces.

[illegible]

PRECIPITATION AT STATIONS REPORTING RAIN, WEATHER, &c., DURING SEPTEMBER, 1899.

STATIONS.	RAINFALL.					THUNDER AND LIGHTNING.	REMARKS.
	Amount in inches.	Days of Over.	No. of Fair Days.	Heaviest Fall in Month.	Date.		
BRITISH COLUMBIA.							
Cumberland.	1.81	5	25	1.02	3		
Alberni.	2.14	9	21	1.07	4		28th. Frost; 30th a little snow on mountains.
Goldstream.	1.22	5	26	0.56	30		Fog on 10 days.
Langley.	1.48	6	6	0.53	29		
Royal Oak.	0.95	4	26	0.65	29		
Nanaimo.	1.17	4	26	0.70	15		
N. W. TERRITORIES.							
Coutts.	2.86	5	26	2.13	13		
Dudsbury.	1.76	7	23	0.39	5	11.	26th. Wind storm.
N. E. Beaver Hills.	0.29	4	26	0.07	6	27.	28th. Frost.
West Beaver Hills.	0.93	9	21	0.39	4	12.	Fog on 3 days; frost 15, 23.
Imperial.	1.27	5	25	0.75	5		17th. Frost.
Salicuts.	4.74	5	25	1.50	3		23th. Frost.
Stirling.	2.56	4	26	1.69	22		
MANITOBA.							
Clear Spring.	1.47	6	25	0.67	1	1, 2, 4.	Snow on 27th.
Rapid City.	1.48	2	29	0.73	14		
Shoal Lake.	0.40	1	29	0.40	4		12th. Frost.
Norquay.	0.47	4	25	0.39	4	1.	28th. Snow.
Greenwood.	1.34	4	26	0.72	6		
Keebank.	0.38	4	26	0.17	27		
Cartwright.	0.71	3	27	0.55	3	3.	28th. Snow.
Hartney.	0.89	2	28	0.55	4		
Pembina Crossing.	1.24	5	24	0.65	4	1, 3, 9, 27.	29th. Temp. 15°.
Belmont.	1.37	4	26	0.13	1	3, 4, 9, 15, 27.	27th. Snow.
Elgin.	0.48	5	27	0.40	14	3, 4.	11th. Frost.
Oakbank.	1.07	6	21	0.46	1		27th. Snow.
Saskirk.	0.84	5	25	0.44	3	3.	13th. Frost; 27th snow.
Morden.	0.90	2	27	0.90	3, 4		21st, 28th Frost.
Beaver Creek.	0.47	2	28	0.47	3, 4		
Turtle Mountain.	0.59	1	26	0.45	14	3.	18th. Frost.
Cartwright (H.).	0.35	1	25	0.35	3		
ONTARIO.							
Dealtown.	2.08	5	25	0.73	1		30th. Frost.
Princeton.	2.28	6	24	1.00	26		5th. Storm of wind.
Port Barwell.	3.35	8	22	0.75	1		30th. Snow.
Sunshine.	3.85	10	26	1.01	25	13.	25th. ice; 30th. $\frac{1}{2}$ in. snow
Dutton.	1.70	5	25	0.60	7	5, 24.	28th-29th. frost; ice, 30th.
Wilton Grove.	1.63	9	20	0.80	24	5, 24.	30th. 4 in. of snow.
Goderich.	2.58	5	25	1.00	21		
Watford.	2.94	7	23	0.87	24		
Wingham.	3.43	7	23	0.68	1	1, 5, 8, 24.	
Deer Park.	1.89	10	19	1.92	1		
Scarboro.	5.27	11	19	2.70	1	1, 7, 24.	23rd. Ice.
Georgetown.	3.70	11	19	1.96	1	1, 4, 5, 7, 17, 18, 24.	14th. Ice, 30th. snow.
Amora.	3.30	10	30	1.51	1		22nd. Severe frost.
Orangeville.	6.26	8	22	3.55	1		30th. Snow.
Warton.	3.43	7	23	0.68	5	5, 7, 17.	22nd. Frost; 30th snow.
Lion's Head.	3.79	6	24	1.20	18	5, 7, 24.	
Providence Bay.	4.25	12	17	2.00	5	5, 7.	29th, 2 in. snow. On 30th.
Huntsville.	3.85	8	22	1.25	18		
Ensdale.	4.61	15	15	1.12	25	5, 18, 24.	14th, 15th, 23rd frost, $\frac{1}{2}$
Nottawasaga Island.	4.90	9	21	1.15	17		17th. Heavy hail storm.
Uxbridge.	4.61	8	22	1.72	5		13th. Ice; 30th. snow.
Madison.	3.44	13	17	0.58	21	4, 7, 17, 24.	13th. Hailstorm; 30th
Jermyn.	3.79	10	20	0.97	1	5, 7, 12, 18.	14th. Frost. [snow.
Lynedoch.	4.66	8	22	0.97	1		
Emmimore.	3.94	6	24	1.50	26		Sheet on 26th.
Cherry Valley.	3.41	8	22	0.65	1	7.	
Glen Elm.	4.57	14	16	0.82	26		6th. Frost; 30th. hail.
Elgin.	4.40	10	20	1.55	27		26th. Heavy storm from
Robin's Mills.	4.25	9	21	1.45	26		N.
Urus.	6.80	17	13	2.04	21		26th. Snowstorm broke
Woods.	3.47	11	19	1.41	26	7, 24.	14th. Frost. [fruit trees.
Croydon.	3.65	6	24	1.10	20	11.	
Parma.	1.50	11	19	1.05	20		
Oliver's Ferry.	6.31	11	19	1.75	26		
Arden.	3.14	15	15	0.60	27	8, 13, 18, 26.	7th. Frost; 23rd. ice.
Montague.	3.66	5	25	1.45	26		22nd. Heavy frost; 30th
Lansdowne.	1.28	6	24	0.55	26	7, 12.	snow.
N. Williamsburg.	3.77	9	21	1.30	26	7.	
Sparrow Lake.	3.42	10	19	1.10	24	7, 12, 17, 24.	15th. Heavy frost.
NEW BRUNSWICK.							
Port Eschmunic.	1.77	8	22	1.36	21	14.	
NOVA SCOTIA.							
Port Morien.	7.55	13	17	3.00	30		
P. E. ISLAND.							
Murray River.	4.46	5	25	2.54	20, 21		6th. Heavy N. W. gale.
Mount Stewart.	3.34	3	27	0.62	30		

Thunder reported on—

1. Barnardo, Stratford, Port Stanley, Toronto, Birnam, Port Hope, Brantford, Bermuda, Stouffville, Weland, Scarboro, Georgetown, Clear Spring, Swift Current, Medicine Hat, Alton.
2. Stony Mountain, Haileybury, Clear Spring, White River, Port Arthur.
3. Turtle Mountain, Barnardo, Grand Manan, Quebec, Father Point, Treherne, Rosebank, Portage la Prairie, Cunnington Manor, Brome, Cartwright, Pembina Crossing, Belmont, Selkirk, Minnedosa, Pouce, Bermuda, Qu'Appelle.
4. Wolfville, Meaford, Stony Mountain, Grand Manan, St. John, Brandon, Treherne, Rosebank, Hamilton, P.E.I., Cockburn Island, Clear Spring, Norquay, Belmont, Yarmouth, Winnipeg, White River, Bermuda, Truro.
5. Meaford, Uplands, Owen Sound, Moose Jaw, Collingwood, N. Sister Rock, Barnardo, Durham, Stratford, Coldwater, Port Stanley, Parry Sound, Birnam, Point Clark, Erasmus, Sprucedale, Agincourt, Port Dover, Brantford, Lucknow, Paris, Stouffville, Providence Bay, Emsdale, Midland, Jermyn, Ridgetown, Dutton, Wilton Grove, Wyoming, Georgetown, Warton, Lion's Head, Alton, Conestogo.
6. N. Sister Rock, Stony Mountain, Treherne, Rosebank, Whiteside, Knee Hill.
7. Meaford, Owen Sound, Durham, Stratford, London, Coldwater, Port Stanley, Toronto, Saugeen, Birnam, Point Clark, Erasmus, Cockburn Island, Hamilton, Ont., Gosfield, Beatrice, Stony Creek, Agincourt, Port Dover, Lucknow, Paris, Providence Bay, Midland, Jermyn, Cherry Valley, Wooler, Lansdowne, Stouffville, Otonabee, Ridgetown, Scarboro, Georgetown, Warton, Lion's Head, N. Williamsburg, Sparrow Lake, Guelph.
8. Port Stanley, Port Dover, Wyoming, Arden, Conestogo.
10. Donald.
11. Toronto, Agincourt, Calvin, Stouffville.
12. Montreal, N. Nicomen, Griffin Lake, Uplands, Nelson, Chilliwack, Gravenhurst, Lindsay, Coldwater, Red Deer, Calgary, Tobacco Plains, Sprucedale, Whiteside, Otonabee, W. Beaver Hills, Jermyn, Croydon, Lansdowne, Sparrow Lake, Bancroft, Banff, White River, Kamloops, St. Agathe, Knee Hill.
13. Fredericton, Sable Island, Hillview, Pipestone, Cunnington Manor, Sable Island, Sunshine, Arden, Edmonton, Regina.
14. Point Escuminac, Bermuda.
15. Haileybury, Red Deer, Cockburn Island, Knee Hill.
17. Meaford, Collingwood, Gravenhurst, Lindsay, Quebec, Coldwater, Toronto, Point Clark, Erasmus, Beatrice, Agincourt, Whiteside, Haliburton, Otonabee, Georgetown, Midland, Swift Current, Bancroft, Guelph, St. Agathe, Alton, Conestogo.
18. Uplands, Gravenhurst, Ottawa, Gosfield, Beatrice, Port Dover, Whiteside, Haliburton, Calvin, Emsdale, Jermyn, Arden.
19. Port Dover.
21. Cockburn Island, Barkerville.
22. Masset.
24. Collingwood, Stratford, Gravenhurst, London, Port Stanley, Toronto, Birnam, Point Clark, Erasmus, Hamilton, Ont., Gosfield, Agincourt, Port Dover, Brantford, Lucknow, Haliburton, Otonabee, Ridgetown, Dutton, Wilton Grove, Wyoming, Guelph, Scarboro, Lion's Head, Emsdale, Midland, Wooler, Sparrow Lake, Bancroft.
25. Port Stanley, Ridgetown, Alton, Conestogo.
26. Crane Lake, Duck Lake, Arden, Regina.
27. Rosebank, Pembina Crossing, Belmont.
28. Scarboro.
29. N. Nicomen, Banff, Victoria.

Aurora Recorded :—

Where the class of aurora is noted by the observer, it is given, (I) being the brightest, (IV) the feeblest in brilliancy.

1. Haileybury, IV ; Hillview, III ; Pembina Crossing, III ; Truro, IV ; Cape Norman, I.
2. Hillview, IV ; St. Albans, III ; Red Deer, IV ; Cunnington Manor, IV ; Muskowpetung, II ; Truro, IV.
3. Hillview, IV ; Tagish, II ; Prince Albert, III.
4. Pembina Crossing, IV.
7. Cunnington Manor, IV.
8. Qu'Appelle, IV.
9. Meaford, IV ; Haileybury, IV ; Quebec, III ; St. Albans, III ; Red Deer, IV ; Lucknow, Georgetown, IV ; Pembina Crossing, III ; St. Agathe, II ; Truro, IV.
10. Barnardo, III ; Hillview, II ; Tagish, III ; Calgary, IV ; Rat Portage, Pembina Crossing, IV ; Calgary, II ; Sydney, IV.

11. Hillview, II; W. Beaver Hills, IV; Pembina Crossing, IV; Prince Albert, I.
12. Barnardo, IV; Hillview, IV; St. Albans, IV; Georgetown, IV; Pembina Crossing, IV.
15. W. Beaver Hills, IV.
16. Red Deer, IV.
17. Tagish, II.
18. Haileybury, III.
24. Barnardo, IV.
25. Haileybury, III; Grand Manan, IV; Hillview, IV; St. Albans, Cockburn Island, Savanne, W. Beaver Hills, III; Pembina Crossing, IV; Minnedosa, IV; Yarmouth, IV; Regina, II; Qu'Appelle, III; Medicine Hat, IV; Truro, III.
26. Moose Jaw, Meaford, III; Haileybury, III; Durham, IV; Coldwater, I; Hillview, III; Cape Magdalen, Cottam, Savanne, Rat Portage, Georgetown, IV; Pembina Crossing, IV; Minnedosa, III; White River, II; Qu'Appelle, IV; Medicine Hat, III; Cape Norman, III.
27. Hillview, IV; St. Albans, III; Tagish, IV; Red Deer, IV; W. Beaver Hills, IV; White River, III; Qu'Appelle, IV.
28. Moose Jaw, Chicoutimi, St. Albans IV; Cape Magdalen, W. Beaver Hills, III; Pembina Crossing, IV; Prince Albert, I; Oonikup.
29. Meaford, IV; Barnardo, II; Gravenhurst, IV; Hillview, III; Channel Island, St. Albans, III; Portage la Prairie, Rat Portage, Georgetown, IV; Pembina Crossing, III; Prince Albert, II; Minnedosa, III; Battleford, III; Cape Norman, II; Oonikup.
30. Father Point, III; St. Albans, IV; Battleford, III.

ABSTRACT OF OBSERVATIONS AT BELLE ISLE. OCTOBER, 1898, TO
SEPTEMBER, 1899, INCLUSIVE.

MONTHS.	BAROMETER AT SEA LEVEL.						TEMPERATURE.					
	Mean.	Max.	Min.	9 a.m.	4 p.m.	9 p.m.	Mean Max.	Mean Min.	Mean Daily Range.	High- est.	Low- est.	Monthly Mean.
	in.	in.	in.									
October, 1898	29.914	30.29	29.61	36.9	38.1	36.5	40.3	34.0	6.3	48.0	25.0	37.2
November	30.012	30.58	29.29	29.5	31.0	29.5	33.0	26.5	6.5	45.0	16.0	29.8
December	29.937	30.21	28.98	20.2	26.1	18.4	22.7	15.7	7.0	34.0	2.0	19.2
January, 1899	29.772	30.40	28.51	2.5	5.0	4.2	7.9	0.4	8.3	15.0	22.0	7.4
February	29.675	30.13	28.66	4.5	7.6	6.4	9.4	2.6	6.8	16.0	21.0	6.9
March	30.094	30.52	29.38	17.7	19.2	17.4	22.4	13.6	8.8	37.0	17.0	18.0
April	30.119	30.66	29.42	31.3	33.2	30.6	35.5	28.0	7.5	42.0	13.0	31.7
May	30.000	30.53	29.72	35.7	36.6	34.0	38.5	30.6	7.9	52.0	20.0	34.6
June	30.109	30.52	29.41	40.8	42.6	39.2	45.0	37.1	7.9	57.0	30.0	41.0
July	30.163	30.55	29.83	48.1	49.5	47.0	52.1	44.9	7.2	59.0	34.0	48.5
August	30.163	30.52	29.79	53.8	54.6	52.9	57.8	51.2	6.6	64.0	43.0	54.5
September	29.974	30.47	29.29	51.3	52.4	50.7	55.4	49.7	5.7	59.0	48.0	52.5

ABSTRACT OF OBSERVATIONS AT BELLE ISLE. OCTOBER, 1898, TO
SEPTEMBER, 1899, INCLUSIVE.

MONTHS.	NO. OF WINDS FROM									VELOCITY IN MILES.			Clouded Sky Mean.	RAIN.		Days of Snow.	No. of Fogs.	No. of Auroras.
	N.	N.E.	E.	E.S.	S.	S.W.	W.	N.W.	Calms.	Mean.	Most Windy Day.	Duration from.		Amount.	Days.			
														in.				
October, 1898	7	19	7	3	1	20	18	18	0	26.8	54.0	S.W.	70	17.01	10	6	14	1
November	5	15	6	10	6	11	19	18	0	19.7	38.8	N.E.	70	15.96	12	6	16	3
December	16	7	7	4	1	15	34	9	0	26.5	60.8	N.E.	63	0.08	2	13	0	5
January, 1899	11	8	4	8	4	10	18	27	0	30.0	67.9	N.W.	59	0.68	1	14	1	2
February	16	15	9	4	0	9	21	10	0	28.4	67.1	S.W.	74	0.00	0	16	1	1
March	12	25	3	5	2	8	17	21	0	18.6	55.0	N.E.	61	0.06	2	14	4	2
April	11	24	14	16	5	3	12	5	0	17.0	32.5	N.E.	79	3.00	8	9	8	0
May	2	35	9	11	5	6	16	9	0	28.7	67.9	N.E.	69	6.20	10	4	7	0
June	5	12	27	4	2	3	31	6	0	12.1	27.9	W.	58	1.19	9	0	11	0
July	1	18	13	16	12	8	16	8	1	13.3	52.9	N.E.	78	5.19	12	0	14	0
August	9	9	0	20	1	17	23	4	0	12.5	25.0	N.	68	3.70	8	0	16	0
September	2	12	4	7	6	27	24	8	0	15.2	32.9	W.	64	3.08	6	0	9	0

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE THE HORIZON IN THE MONTH OF SEPTEMBER, 1893.

	HOURS ENDING															
	5 a.m.	6 a.m.	7 a.m.	8 a.m.	9 a.m.	10 a.m.	11 a.m.	Noon.	1 p.m.	2 p.m.	3 p.m.	4 p.m.	5 p.m.	6 p.m.	7 p.m.	8 p.m.
Vancouver			0.00	0.22	0.54	0.62	0.71	0.75	0.78	0.77	0.81	0.81	0.72	0.63	0.40	0.00
Kuper Island			0.00	0.04	0.20	0.57	0.70	0.74	0.70	0.71	0.79	0.79	0.70	0.66	0.41	0.00
Alexis			0.00	0.04	0.15	0.42	0.52	0.63	0.65	0.67	0.73	0.70	0.66	0.36	0.06	0.00
Bathford			0.39	0.52	0.63	0.72	0.75	0.74	0.69	0.68	0.66	0.67	0.63	0.46	0.11	0.00
Inlet Head			0.00	0.00	0.14	0.58	0.77	0.78	0.76	0.74	0.74	0.80	0.63	0.33	0.01	0.00
Brandon			0.09	0.14	0.44	0.62	0.66	0.72	0.73	0.69	0.66	0.69	0.72	0.66	0.29	0.00
Winnipeg			0.05	0.20	0.47	0.56	0.66	0.71	0.70	0.72	0.70	0.69	0.66	0.43	0.07	0.00
Durham			0.00	0.02	0.20	0.56	0.59	0.41	0.53	0.56	0.54	0.52	0.54	0.47	0.21	0.02
Woodstock			0.00	0.03	0.26	0.49	0.51	0.56	0.50	0.60	0.54	0.52	0.51	0.41	0.21	0.01
Toronto			0.00	0.04	0.37	0.55	0.57	0.50	0.50	0.54	0.53	0.57	0.48	0.41	0.15	0.00
Lindsay			0.01	0.16	0.26	0.44	0.49	0.47	0.48	0.44	0.50	0.52	0.42	0.38	0.30	0.08
Barrie			0.00	0.05	0.24	0.40	0.43	0.46	0.51	0.53	0.54	0.51	0.51	0.35	0.10	0.00
Kingston			0.00	0.00	0.42	0.53	0.58	0.57	0.52	0.48	0.51	0.50	0.38	0.45	0.18	0.00
Ottawa			0.00	0.10	0.34	0.42	0.43	0.44	0.43	0.47	0.45	0.39	0.33	0.32	0.15	0.00
Montreal			0.00	0.13	0.29	0.41	0.50	0.52	0.55	0.52	0.50	0.49	0.48	0.32	0.00	0.00
Fredericton			0.20	0.36	0.48	0.55	0.56	0.63	0.63	0.63	0.63	0.55	0.47	0.29	8	9.00
	Vancouver	Kuper Island	Alexis	Bathford	Inlet Head	Brandon	Winnipeg	Durham	Woodstock	Toronto	Lindsay	Barrie	Kingston	Ottawa	Montreal	Fredericton
Mean proportion for month	0.62	0.56	0.46	0.60	0.50	0.56	0.53	0.38	0.42	0.44	0.39	0.38	0.41	0.33	0.43	0.48
Difference from average	+ 25	+ 20	- 18	+ 13	- 11	+ 04	- 19	-	- 06	- 15	- 14	- 10	- 11	-	- 12	- 00
Maximum daily amount	0.99	0.90	0.72	0.94	0.68	0.90	0.88	0.80	0.80	0.83	0.98	0.81	0.80	0.90	0.97	0.91
Dates	7	15	28	20	20	24	25	15	14	15	9	9	15	15	9	28
No. of days completely clouded	1	0	6	1	4	3	0	8	6	6	7	5	8	8	4	3

FORECASTS FOR SEPTEMBER, 1899.

The forecasts issued by this office at 11 p.m. each night, are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 958. These were divided as follows:—

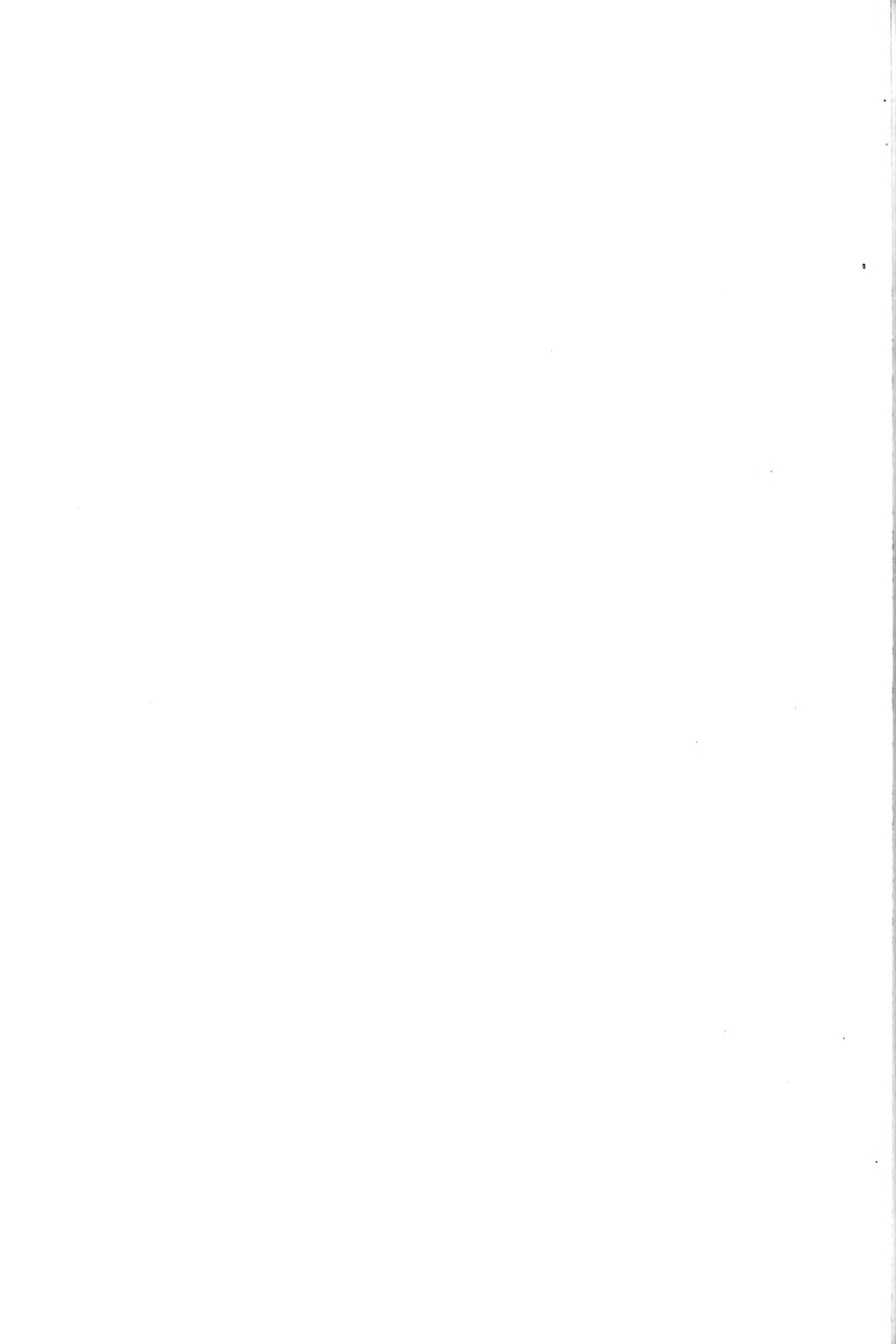
DISTRICT	VERIFIED.				
	No. Issued	No. Fully	No. Partly	No. Not	Percentage
Manitoba.....	87	73	9	5	89.1
Lake Superior.....	111	79	23	9	81.5
Lower Lake Region.....	119	79	20	20	74.8
Georgian Bay.....	119	79	25	15	76.9
Ottawa Valley.....	103	70	21	12	78.2
Upper St. Lawrence.....	103	75	18	10	81.6
Lower St. Lawrence.....	99	76	15	8	84.3
Gulf.....	105	79	15	11	82.4
Maritime Provinces.....	112	78	21	13	79.0
Total.....	958	688	167	103	80.5

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by two and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent the predictions have been verified, the reports from the agents at all observing stations, as well as the telegraphic reports, are used.

R. E. STUPART,
Director.

Meteorological Office, Toronto,
26th October, 1899.



METEOROLOGICAL SERVICE, DOMINION OF CANADA

Monthly Weather Review.

VOL. XXIII

OCTOBER, 1899.

No. 10

INTRODUCTION.

In compiling this preliminary Review the principal data were obtained from the telegraph reports of observations received at this office for the purpose of weather forecasting, compiled by certain volunteer observers and storm signal agents. For the material used in tracing the paths of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

REMARKS UPON THE WEATHER.

The most distinctive feature in the weather conditions of Canada in October was the low temperature over the North-west Territories, also the high temperature generally in Manitoba and eastward to the Atlantic Coast. The rainfall was also abnormal in many districts, more especially in portions of British Columbia, Ontario, and Nova Scotia where it was well above average. In spite of the open weather in the eastern portion of the Dominion the trees were denied of leaves at about the average date; nevertheless many birds delayed their migration southward and some plants put forth new leaves.

In British Columbia the weather conditions varied considerably with the locality, there was however, much cloud everywhere, and while the temperature was rather below average in northern and eastern districts it was average or somewhat above elsewhere. The rainfall, like the temperature, was generally above average over the Islands and western districts and below over the eastern portion of the Province. There was snow high up on the mountain sides on the 2nd and frosts occurred at night upon four or five occasions.

The weather in the North-west Territories, although fine and warm from the 1st to the 8th, also during the last few days of the month, was exceptionally cool and unsettled during the intervening period and the mean temperature for the month was below average. At most places the rainfall was average or somewhat above. Snow fell upon several occasions, but it had melted in many places at the end of the month. Frosts occurred frequently and at Mosquit Creek in Alberta a low was recorded on the 14th. This low temperature extended in severity the minimum at English Valley, Territory, by two degrees. Trees were bare early in the month.

In the Province of Manitoba there was mainly fine and warm weather during the early and latter part of the month and the mean temperature and rainfall at most places were above average. Snow fell at many places, but it had all disappeared by the end of the month. The minimum temperature of the month occurred generally on the 19th and ranged from 1° at Bernardo to 18° at Stony Mountain and Winnipeg. Growth in plant life had practically ceased by the 15th.

The weather in Ontario was exceptionally fine and mild, and although the rainfall was comparatively light in the more easterly cities, also in districts east of Lake Superior and the Georgian Bay, it was generally above average elsewhere. Light snow fell in many portions of the Province, but soon disappeared. Severe frosts were reported from nearly all districts and at most stations the minimum temperature was well below 32°. Thunderstorms occurred at many places but the damage caused thereby was comparatively light. By the 20th most trees were denied of leaves but there was still some growth noticed in plant life.

In the Province of Quebec the fine bright weather almost extended throughout the month there being comparatively little rain and the mean temperature being well above average at most places. On or after the 20th some cooler weather occurred and the minimum temperature of the month was recorded, 21° being reported from Father Point. The number of frosts was somewhat greater than usual. The trees were bare by the 29th.

The fine mild and dry weather of the last two named provinces also extended to New Brunswick and severe storms expected so often at this time of the year were not reported. Night frosts occurred rather frequently and the lowest temperature recorded was 23° at St. Stephen. Light snow fell at many places and in the interior the ground was well covered on the 3rd.

Although the weather in Nova Scotia was exceptionally mild it was not quite so fine as in the last named province and in many places the rainfall was unusually large, nevertheless there were many bright warm days and at quite a large number of places the rainfall was light. Gales occurred in many districts on the 15th, 21st and 29th, and some damage along the coast was caused thereby. Frosts occurred at several stations, but they were not severe. The trees were almost bare of leaves by the 31st.

In Prince Edward Island the weather took much the same character as that in New Brunswick, it being for the most part unusually fine and mild. No killing frosts were reported and only very light snow flurries occurred. A moderate gale was reported on the 7th but it caused little or no damage. The trees had all changed colour by the 10th and most were bare by the 31st. E. F. PAYNE.

ATMOSPHERIC PRESSURE.

The mean atmospheric pressure for the month differed widely from average over the eastern portion of the Continent, embracing Canada from the Upper Lake Region to Newfoundland, and the United States from the Ohio Valley to the Atlantic; from Lake Huron to the Gulf the departure ranged between 0.15 and 0.18 of an inch higher than the average. Westward from Port Arthur and Duluth on Lake Superior an area within which the departure was from average to +0.05 extended to the Rocky Mountains, while both to the northward towards Athabasca and Hudson's Bay and southward over the western United States and again on the Pacific Coast the pressure was generally a little below average.

HIGH AREAS.

No less than ten high areas have been charted, of these five, including one which was centred in the Lake Region at the opening of the month and one which was spreading rapidly across the Lake Region at the close of it, can be traced clearly, either quite across the Continent or at least from the Mountains; two seem to have developed to the southward of Hudson's Bay and three entered the Continent from the Pacific and dispersed over the Western States. Perhaps the most important of them was that which appeared over Athabasca on the 11th, and brought fairly cold weather in the North-west Territories, but one which appeared in much the same region on the last day of the month was also very pronounced; it moved very quickly and brought a decided cold wave to the Lake Region during the first days of November.

LOW AREAS.

The tracks of low areas differed very decidedly from normal; only one, and that of very moderate intensity passed across the Lake Region; two, one of which first appeared over the Gulf of Mexico, and the other, a West India hurricane, moved up the Atlantic Coast of the United States; one of moderate intensity moved northward from the Atlantic to the Gulf of St. Lawrence. The remainder, five in number, were chiefly confined to the west and north-west States and Territories and only three of them can be traced in a far northern course across James Bay to Labrador. No. 1 cannot be traced east of the Lake Region; while over the North-west Territories it was attended by local rains. No. 2 appeared to the south-east of Nova Scotia early on the 3rd, and during the day gave strong northerly winds and rain over the eastern part of the Province and in the Gulf and subsequently when the storm centre was near Belle Isle, a fresh westerly gale prevailed in the Gulf. No. 3 was centred near the west Florida coast on the morning of the 5th, and thence moved rapidly up the Atlantic coast with increasing energy. During the night of the 6th-7th the centre passed across the Maritime Provinces and a very heavy rain with fresh gales prevailed. Nos. 4 and 5 passed eastward across the North-west Territories and then disappeared, the former was accompanied by fine warm weather and the latter by local rains in Manitoba. Nos. 6 and 7 may perhaps be traced from the coast of California, whence moving eastward to Arkansas, they then turned northward, the former in conjunction with an important high causing high winds with snow and rain in the Territories and Manitoba between the 11th and 13th, and the latter causing strong gales with rain and snow in Manitoba on the 15th and 16th. Both areas passed far to the northward across Hudson Bay and neither of them exerted a very decided influence on the weather in Canada east of Lake Superior. No. 8 was a moderate disturbance which appeared over the west Gulf States on the 26th; it moved quickly to the Lower Lake Region and thence to the Gulf of St. Lawrence and was attended throughout its course by strong winds and rain. No. 9 was a West India hurricane which passed across Cuba on the 29th and then moved northward. During the night of the 31st, the centre was in Virginia and easterly winds in advance of it were increasing in the Maritime Provinces and the weather was generally unsettled and showery in the St. Lawrence Valley.

WINDS.

In the North-west Territories and also in the Maritime Provinces, the generally prevalent westerly winds were fairly in evidence but in the Lake Region there was a very decided departure from normal conditions, inasmuch as easterly winds predominated to a marked degree. Over the larger portion of the Dominion the

month was one of the quietest Octobers on record, on the Great Lakes while strong winds occurred on several occasions there was nothing, even locally, beyond a moderate gale. In the Maritime Provinces and Gulf of St. Lawrence a fresh to heavy gale occurred on the 7th, and strong winds and moderate gales were recorded in the Gulf on several occasions. There was a strong northerly to westerly gale in Manitoba on the 16th, and very strong winds had occurred generally during the previous week.

TEMPERATURE.

The mean temperature of the month differed little from normal on Vancouver Island and the Lower Mainland of British Columbia, but on the Upper Mainland it ranged from 2 to 5 below. In Alberta and the Western portions of Assiniboia and Saskatchewan it was about 4 below average, but east of this near the western boundary of Manitoba, the departure from average became plus, and Eastern Manitoba was from 3 to 4 above. All the remaining inhabited portions of Canada were also above, the greatest departures being from 5 to 6 in Western and Southern Ontario. At nearly all points in the Maritime Provinces the difference from normal was about 2 above.

The Highest and Lowest Temperature in each Province during October, 1899, were

British Columbia,	76.0 on 4th at Hazelmere.	10.0 on 13th at Barkerville.
North-west Territories,	83.0 on 5th at Gatesgarth.	10.0 on 14th at Mosquito Creek.
Manitoba,	83.5 on 6th at Awenae.	1.0 on 10th at Barnardo.
Ontario,	85.0 on 15th at Cottam.	12.0 on 1st at Savanne.
Quebec,	77.0 on 15th at Richmond.	16.0 on 22nd at Brome.
New Brunswick,	74.4 on 26th at St. Stephen.	20.0 on 21th at Sussex.
Nova Scotia,	74.0 on 15th at Port Hastings. and on 19th at Wolfville.	23.0 on 24th at Wolfville.
Prince Edward Island,	70.0 on 1st at Hamilton.	33.5 on 23rd at Summerside.

PRECIPITATION.

The conditions as regards precipitation, were not abnormal to any marked degree in any part of the Dominion. From British Columbia reports received, it would appear that the average was somewhat exceeded in that Province; and in the North-west Territories and Manitoba the total, while comparatively small in most localities was yet in excess of the average, and in the Territories fell largely as snow. At Qu'Appelle, the station reporting the largest amount, it was wholly snow, and twenty-four inches fell between the 10th and 11th. In the Peninsula of Ontario, that is over the portion of the Province lying west of a line connecting Parry Sound and Belleville, the rainfall was considerably above average, and at some stations near Lakes Ontario and Erie nearly double the average, but in the more eastern and northern parts of the Province there was a deficiency, the rainfall averaging in the neighbourhood of two inches. In Quebec and New Brunswick there was a very general deficiency, Montreal being the only station reporting an amount slightly greater than average. In Nova Scotia and Prince Edward Island the fall was for the most part either equal to or in excess of the normal.

BRIGHT SUNSHINE.

Bright sunshine was below average in British Columbia and the North-west Territories, the percentage of possible duration ranging from 19 at Agassiz in the Lower Frazer Valley, B.C. to 38 at Battleford, N. W. T., both being 11 less than the average. In Manitoba the amount recorded was just equal to the average, or 37 per cent of the possible at Winnipeg. In Ontario the average was exceeded by from 3 to 7 per cent, the amounts recorded ranging from 38 at Barrie to 46 at Woodstock and Kingston. At Montreal the percentage of the possible duration was 40, or 1 less than average, and at Fredericton, N.B. it was 50 or 8 in excess of the average.

c. Histograms not reduced to zero level. • Stations not furnished with Registering Thermometers.

TEMPERATURE

[illegible]

N. W. FURTERER:

[illegible]

PRESSURE, TEMPERATURE, WIND AND PRECIPITATION AT STATIONS IN THE DOMINION OF CANADA, OCTOBER, 1934

* Stations not furnished with Registering Thermometers

STATION	PRESSURE.			Elevation above sea level, in feet.	TEMPERATURE.			DIRECTION OF WIND FROM			VELOCITY OF WIND			PRECIPITATION.			Days with 1/10 or more in month.	No. of Airs.	No. of Clouds.	No. of Fogs.											
	Mean reduced.	Highest.	Lowest.		Mean.	Infimum from average.	Yours observe.	Highest.	Date.	Lowest.	Mean daily range.	Mean relative humidity.	Mean amount of wind.	No. of days completely calm.	N.	N. E.					E.	S. E.	S.	S. W.	W.	N. W.	Total number of hours.	Mean miles per hour.	Highest days per hour.	Date of the greatest fall.	Amount.	Inches from average.
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0
Albany	30.10	30.35	29.95	150	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0	52.0	15	50.0	48.0</					

[illegible]

PRECIPITATION AT STATIONS REPORTING RAIN, SNOW, WEATHER, &c., DURING
OCTOBER, 1899.

STATIONS	RAINFALL					SNOWFALL					Thunder and Lightning &c.
	Amount in inches.	Days of Or Over	No. of Fair Days	Heaviest Fall in Month.	Date.	Amount in inches.	No. of Days	Heaviest Fall in Month.	Date.		
BRITISH COLUMBIA											
Nanaimo	5.91	13	18	2.44	19						
Langley	5.78	12	19	1.49	18						
Goldstream Lake	6.22	17	14	1.33	19						
Alberni	6.54	15	16	1.50	20						
Chimberland	6.84	14	17	1.67	19						
Royal Oak	3.89	14	17	0.70	15						13th, first frost.
N. W. TERRITORIES											
Saltonst	0.25	1	20	0.25	8	9.5	6	4.0	16		
Rouleau	0.50	1	24	0.50	22	18.5	6	10.0	11		
N. E. Beaver Hills	0.05	1	20	0.05	8	6.0	10	3.0	17		
West Beaver Hills	0.01	1	18	0.01	8	5.6	12	2.0	16		
Imperial	0.12	1	24	0.12	6	3.7	4	3.7	9 10		
Capitol	0.12	2	24	0.20	8	14.0	6	6.0	14		
Duchess	0.35	8	24	0.35	8	9.0	6	9.0	9 11		
Stirling	R	0	23	R	16	4.0	7	4.0	9 15		
MANITOBA											
Shed Lake	R	0	25	R	9	12.0	5	5.0	13		
Hartney	1.50	1	24	0.85	13	9.0	3	4.0	16		
Greenwood	2.34	1	26	0.86	12		1		16		
Rapid City	1.37	6	23	0.75	15	7.0	2	4.5	16		
Cartwright	0.24	9	22	0.09	23	19.6	3	9.0	16		
Elkhout	1.86	11	20	0.78	11 13	Snow included in rain.					
Pembina Crossing	2.05	6	21	1.04	11 13		5				
Norquay	1.65	5	24	0.84	13	4.0	3	4.0	16		
Saskatoon	0.36	3	28	0.24	10						
Morden	0.47	2	28	0.10	12	0.3	1	0.3	18		
Elgin	1.68	10	18	0.50	12	6.5	6	3.0	16		
Hurtle Mountain	2.02	7	22	1.02	13	9.0	3	5.0	16		
Clearspring	1.01	4	27	0.57	13						
Oakbank	1.56	4	24	0.50	13		2				
Beaver Creek	1.91	4	27	1.03	13						
ONTARIO											
Uxas	4.41	12	19	1.32	28						14th; 31st, robins still here.
Huntsville	3.45	4	27	1.75	28						
Oliver's Ferry	2.15	7	24	1.15	28						
Emmerson	3.08	5	16	1.23	28						
Glen Elm	3.63	10	21	0.93	28						
Providence Bay	1.92	8	23	0.90	17						14th, 15th.
Sparrow Lake	2.98	8	22	0.90	28						15th, 23rd.
Thompson	1.04	2	28	0.58	15		1		20		14th.
Deer Park	1.26	12	19	1.09	27						
Dutton	4.71	7	24	1.73	27						22nd, 23rd.
Warford	3.33	7	24	2.33	12						
Scarboro	3.92	15	15	0.98	28						14th, 22nd, 23rd.
Orangeville	3.96	10	21	1.04	27						
Ennsdale	3.19	12	19	0.60	28						14th, 22nd, 23rd.
Lansdowne	1.93	6	25	0.81	28						
Croydon	3.25	6	25	1.80	28						
Parma	2.93	10	21	0.68	28						
Midland	2.91	11	20	0.52	28		1		20		14th, 15th, 23rd.
Georgetown	4.33	16	14	0.98	27						14th, 22nd, 23rd.
Alden	3.24	12	19	1.65	29						
Sundown	3.01	10	21	0.50	27						14th, 22nd, 23rd, 26th.
N. Williamsburg	2.79	9	22	1.39	27						
Goderich	2.03	5	26	1.00	27						
Amora	3.20	9	22	1.51	27						
Deftown	2.76	7	24	1.20	27						
Wilton Grove	4.14	11	20	2.01	27						
Jenney	2.47	5	26	0.60	18						15th, 16th, 23rd.
Woodo	3.40	10	21	0.81	17						14th, 24th.
Port Burwell	4.23	9	22	1.00	28						
Lions Head	2.97	7	24	0.70	27						13th, 22nd.
Warton	3.23	7	24	1.00	27						15th, 22nd.
Lansdown	4.49	7	24	2.21	21 25						
Princeton	2.98	6	25	1.56	28						
Montague	2.60	5	26	1.03	28						
Wawing	4.19	9	22	1.65	27						14th, 22nd.
Elton	2.46	5	26	0.65	29						
Roblin's Mills	6.26	25	26	5.06	27 28						
Elmhurst	4.00	7	24	1.22	27						14th.
Cherry Valley	1.75	6	25	0.34	22						
NEW BRUNSWICK											
Point Escommu	2.83	6	25	1.43	6 7						
NOVA SCOTIA											
Fort Morden	4.21	9	22	1.45	22						
P. E. ISLAND											
Mount Stewart	4.27	6	25	2.84	6 7						
Merula River	5.21	12	19	3.04	4 7						

Thunder recorded on—

5. Rivers Inlet, Sable Island, Oonikup, Quatsino.
6. Calgary.
7. Calgary, *heavy hail*.
13. Lion's Head, N. Sister Rock, Cockburn Island, Port Arthur.
14. Coldwater, Gravenhurst, Stratford, Lindsay, Ursa, Providence Bay, Deer Park, Scarboro, Emsdale, Midland, Georgetown, Sunshine, Wyoming, Uxbridge, Alton, Uplands, Owen Sound, Otonabee, Ridgeway, Stouffville, Bancroft, Beatrice, Paris, Spruceville, Agincourt, Hamilton, St. George, Stony Creek, Haliburton, Meaford, Kimmount, Toronto, Parry Sound, Ottawa, Saugeen, Guelph, Durham.
15. Cockburn Island, Durham, Coldwater, Gravenhurst, Lindsay, Providence Bay, Midland, Jernyn, Wiarton, Bognor, Otonabee, Collingwood, Lakefield, Point Clark, Meaford, N. Sister Rock.
16. Jernyn, Lakefield.
17. London, Lindsay.
20. Montague, Agincourt, Quatsino.
22. Durham, Toronto, Brantford, Port Dover, Birnam, Hamilton, Lucknow, Cockburn Island, Port Stanley, London, Stratford, Dutton, Scarboro, Emsdale, Sunshine, Wilton Grove, Jernyn, Lion's Head, Wyoming, Alton, Uplands, Owen Sound, Welland, Sarnia, Point Clark.
23. Coldwater, Gravenhurst, Lindsay, Providence Bay, Sparrow Lake, Dutton, Scarboro, Emsdale, Midland, Georgetown, Sunshine, Wiarton, Wyoming, Bognor, Otonabee, Bancroft, Point Clark, Beatrice, Birnam, Agincourt, Meaford, Erasmus, Toronto, Port Stanley, Saugeen, Peterboro.
24. Wooler, Kimmount, Father Point, Haileybury.
26. Sunshine.

Aurora recorded—

Where the class of aurora is noted by the observer, it is given, (I) being the brightest, (IV) the feeblest in brilliancy.

2. West Beaver Hills, IV; Aweme, IV.
3. Savanne; St. Anne, II.
4. Prince Albert, I.
5. Gravenhurst, IV; Barnardo, IV; Pembina Crossing, III; W. Beaver Hills, IV; Cape Magdalen; Red Deer, IV; Duck Lake, III; Hillview, II; Rat Portage; Georgetown, IV; Toronto; Qu'Appelle, IV; Yarmouth, IV; Quebec, IV; Toronto, IV; St. Anne, IV.
6. Savanne; Qu'Appelle, IV; Prince Albert, I.
7. Pembina Crossing, III; Cannington Manor, II; Aweme, II; Qu'Appelle, IV; Haileybury, IV.
14. Chicoutimi; Father Point, III; Quebec, IV; Haileybury, IV; St. Anne, II.
15. Quebec, IV; St. Anne, IV.
22. Cape Chatte, II; Tagish, II; Alton, I; Yarmouth, IV; Dalhousie.
23. West Beaver Hills, IV; Father Point, III; Truro, IV; St. Anne, III.
24. West Beaver Hills, IV; Red Deer, II.
25. Cannington Manor, IV; Savanne; Minnedosa, IV.
26. Cape Chatte, IV; Savanne; Father Point; St. Anne, III.
27. Savanne.
28. Portage la Prairie; Hillview, III; Savanne.
29. Savanne.
30. Pembina Crossing, III; West Beaver Hills, IV; Swift Current, IV; Prince Albert, II.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN
WAS ABOVE THE HORIZON IN THE MONTH OF OCTOBER, 1896.

	Hours Ending															
	5 a.m.	6 a.m.	7 a.m.	8 a.m.	9 a.m.	10 a.m.	11 a.m.	Noon.	1 p.m.	2 p.m.	3 p.m.	4 p.m.	5 p.m.	6 p.m.	7 p.m.	8 p.m.
Victoria			0.00	0.12	0.24	0.30	0.30	0.37	0.42	0.46	0.46	0.35	0.25	0.63		
Kuper Island			0.00	0.03	0.12	0.21	0.37	0.38	0.38	0.45	0.40	0.41	0.33	0.06		
Agassiz			0.00	0.00	0.10	0.17	0.25	0.27	0.33	0.35	0.31	0.22	0.10	0.01		
Battleford			0.17	0.33	0.42	0.44	0.48	0.49	0.48	0.44	0.46	0.35	0.07	0.00		
Indian Head			0.00	0.03	0.22	0.39	0.41	0.39	0.41	0.39	0.38	0.35	0.05	0.00		
Brandon..			0.02	0.17	0.25	0.42	0.44	0.46	0.46	0.41	0.42	0.39	0.16	0.03		
Winnipeg.			0.06	0.22	0.41	0.48	0.51	0.47	0.46	0.46	0.46	0.34	0.15	0.00		
Durham			0.00	0.14	0.40	0.47	0.48	0.51	0.50	0.51	0.55	0.60	0.52	0.18		
Woodstock			0.00	0.11	0.51	0.55	0.60	0.62	0.61	0.60	0.60	0.53	0.30	0.02		
Toronto			0.00	0.25	0.53	0.52	0.53	0.61	0.55	0.56	0.57	0.49	0.31	0.03		
Lindsay.			0.08	0.26	0.43	0.45	0.47	0.49	0.49	0.46	0.48	0.42	0.38	0.12		
Barrie			0.00	0.21	0.44	0.48	0.48	0.45	0.47	0.47	0.51	0.41	0.19	0.00		
Kingston.			S	0.39	0.51	0.58	0.61	0.61	0.59	0.55	0.51	0.46	0.25	0.03		
Ottawa			0.00	0.23	0.35	0.40	0.40	0.47	0.51	0.45	0.39	0.38	0.21	S		
Montreal.			0.01	0.17	0.40	0.53	0.46	0.43	0.46	0.38	0.42	0.33	0.08	0.00		
Fredericton			0.03	0.29	0.40	0.51	0.63	0.66	0.55	0.49	0.52	0.51	0.45	0.06	0.00	
	Victoria	Kuper Island	Agassiz	Battleford	Indian Head	Brandon	Winnipeg	Durham	Woodstock	Toronto	Lindsay	Barrie	Kingston	Ottawa	Montreal	Fredericton
Mean proportion for month	0.30	0.30	0.19	0.38	0.28	0.33	0.37	0.41	0.46	0.45	0.42	0.38	0.46	0.25	0.40	0.50
<i>Co-efficient sun hour factor</i>																
Difference from average	.06	.03	.11	.11	.10	0.00	0.00		.07	.03	.03	.01	.04		.01	.08
Maximum daily amount	0.89	0.86	0.71	0.85	0.81	0.90	0.84	0.91	0.91	0.92	0.97	0.85	0.89	0.86	1.00	0.93
Date..	3 4	12	4	29	4	3	6	30	29	20	30	30	7	30	21	13
No. of days completely clouded.	12	12	16	6	12	41	8	8	6	6	7	9	6	8	7	4

OBSERVATIONS AT MOOSE FACTORY, HUDSON BAY, 1899.

Latitude, N. 51° 16'. Longitude, W. 80° 56'. Height, 305 feet.

	MEAN PRESSURE AT 32°.			TEMPERATURE.							PRECIPITATION.		Aurours.	Thunder Storms.
	9 a.m.	2 p.m.	7 p.m.	9 a.m.	2 p.m.	7 p.m.	Mean Max.	Mean Min.	Monthly Mean	Max. + Min.	Total Amt.	Depth of Snow.		
1899.	m.	in.	in.								m.	in.		
January	29.96	29.95	29.95	9.0	0.4	7.3	4.3	-18.2	6.9	33.0	42.0		5	
February	29.93	29.89	29.92	6.4	1.2	3.8	7.5	-16.4	4.4	33.0	43.6		10	
March	29.99	29.96	30.00	4.8	13.8	5.5	16.5	-9.8	3.1	37.0	34.0	1.50	15.0	5
April	29.93	29.94	29.94	35.4	39.5	33.8	43.6	-22.6	32.8	72.0	14.9	0.52	3	3
May	30.00	29.97	29.97	41.0	48.9	45.2	53.4	-31.4	43.9	78.0	24.0	3.18	2	
June	29.96	29.89	29.90	54.2	57.0	52.7	61.9	-41.7	55.8	83.0	29.0	3.26	0	6
July	29.84	29.80	29.81	64.8	67.7	62.2	71.9	-49.0	60.5	87.0	34.0	1.65	0	5

OBSERVATIONS AT NORWAY HOUSE, N. W. TERRITORIES, 1899.

Latitude, N. 53° 58'. Longitude, W. 97° 52'. Height, 730 feet.

	MEAN PRESSURE AT 32°.			TEMPERATURE.							PRECIPITATION.		Aurours.	Thunder Storms.
	9 a.m.	6-28 p.m.	Mean.	9 a.m.	6-28 p.m.	Mean Max.	Mean Min.	Mean Daily Range	Monthly Mean	Max. + Min.	Total Amt.	Depth of Snow.		
1899	m.	in.	in.								m.	in.		
March	29.27	29.28	29.273	7.3	0.8	7.6	16.6	-24.2	4.4	20.0	36.0	0.28	2.8	7
April	29.09	29.08	29.089	20.9	32.5	33.8	18.1	-20.7	28.5	63.5	9.0	0.63	1.0	2
May	29.21	29.18	29.169	42.3	47.0	55.6	32.6	-23.0	44.4	78.0	12.0	1.59	8.6	1
June	29.03	29.03	29.030	55.8	60.3	67.5	44.9	-22.6	56.2	88.5	33.5	3.73	0	4
July	29.08	29.05	29.065	62.0	65.9	71.8	52.3	-19.5	62.1	84.0	40.0	2.53	1	8
August	29.02	29.05	29.03	57.8	59.4	65.6	48.6	-17.0	57.1	77.0	29.7	2.46	12	4

OBSERVATIONS AT FORT CHURCHILL, HUDSON BAY, 1899.

Latitude N. 48° 51'. Longitude W. 94° 10'. Height, 38 feet.

	MEAN PRESSURE AT 32°.			TEMPERATURE.							PRECIPITATION.		Aurours.	Thunder storms.
	6 a.m.	2 p.m.	10 p.m.	6 a.m.	2 p.m.	10 p.m.	Mean Max.	Mean Min.	Monthly Mean	Max. + Min.	Total Amt.	Depth of Snow.		
1899.	m.	in.	in.								m.	in.		
January	29.99	29.95	29.96	24.0	19.5	21.9	14.6	-34.3	24.5	13.0	57.0	0.12	1.2	4
February	29.92	29.93	29.91	22.2	15.9	19.3	12.7	-31.2	22.0	10.0	50.0	0.06	0.6	9
March	29.14	30.15	30.16	16.0	7.0	25.3	0.8	-25.3	13.0	5.0	45.0	0.41	4.1	12
April	29.92	29.93	29.93	13.4	20.9	15.3	30.0	-4.2	17.1	18.0	18.0	0.89	3.0	2
May	29.11	30.11	30.10	22.6	27.7	24.2	34.6	-12.6	23.6	57.0	10.0	6.37	3.7	1
June	29.94	29.93	29.92	42.8	45.4	40.0	52.1	-28.8	40.4	75.0	13.0	2.40	0.5	0

FORECASTS FOR OCTOBER, 1899.

The forecasts issued by this office at 11 p.m. each night, are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 937. These were divided as follows:—

District.	No. Issued.	VERIFIED.			Percentage
		No. Fully	No. Partly	No. Not	
Manitoba	91	63	20	8	80.2
Lake Superior	102	64	26	12	75.5
Lower Lake Region	118	82	24	12	79.7
Georgian Bay	115	79	24	14	77.8
Ottawa Valley	99	75	15	9	83.3
Upper St. Lawrence	102	73	21	7	82.8
Lower St. Lawrence	104	67	25	12	76.4
Gulf	99	65	21	13	76.3
Maritime Provinces	105	71	16	18	75.2
Total	937	640	192	105	78.5

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by two and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent the predictions have been verified, the reports from the agents at all observing stations, as well as the telegraphic reports, are used.

R. F. STUPART,
Director.

Meteorological Office, Toronto,
November 27, 1899.

METEOROLOGICAL SERVICE, DOMINION OF CANADA.

Monthly Weather Review.

VOL. XXIII

NOVEMBER, 1899.

No. 11

INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather forecasting, and reports by mail from voluntary observers and storm signal agents. For the material used in tracing the paths of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

REMARKS UPON THE WEATHER.

The weather of November throughout the greater part of Canada was exceedingly fine, mild and dry; and the mean temperature reported from stations in British Columbia, the Territories and Manitoba were almost phenomenal, exceeding the average in some places by more than 20°. Snow was reported from nearly every station and in some sections of the country the falls were heavy but by the end of the month the ground was bare nearly everywhere. In many districts plants showed signs of growth and some wild flowers were still in bloom on the 30th.

In British Columbia the weather, unlike that in other portions of the country, was unusually gloomy, and over the islands and lower mainland it was exceedingly wet; nevertheless it was exceptionally mild, and on the last day of the month the signs of winter were few. At some stations the maximum temperatures were well above 60° whilst at a few places the minimum temperatures were not much above zero. In many districts wild flowers were still in bloom on the 30th, and some plants put forth new leaves.

In the North-west Territories the weather was most exceptionally fine, mild and dry, the amount of sunshine being unusually large, the rainfall in most places light and the mean temperature at some stations as much as 20° above average. The minimum temperatures recorded were generally from 10° to 20°, and the maximum temperatures from 55° to 65°. Snow fell in some localities but in most cases it was light, and by the 30th the ground was bare again. Garden and wild flowers were in bloom on the last day of the month and the rivers were free of ice.

The mild weather in the Territories also extended to Manitoba, but in this province there was more precipitation and in the eastern portion the weather was not so fine. The minimum temperatures which occurred before the 20th were generally lower in this province, but the maximum temperatures were about the same. Snow fell in most districts but soon disappeared. Ploughing was continued up to the last day of the month, at which date the rivers were still open.

In Ontario the weather was exceedingly fine, mild and dry, the mean temperature being generally from 2° to 4° above average and considerably higher to the north of Lake Huron. The precipitation which was almost altogether rain was well above average in all districts, and the amount of bright sunshine also exceeded the average. Light snow fell upon several occasions but it had all melted by the 30th. In the southern and western counties the minimum temperatures were generally above 20° whilst in the northern districts they were somewhat lower. In many places garden and wild flowers were still in bloom on the last day of the month and there was little to indicate winter.

In the Province of Quebec the weather was somewhat similar to that in Ontario but the mean temperature was only just above average and there was rather more precipitation. The minimum temperatures which occurred generally before the 20th were below 20°, and at one station, namely Brome,—5° was recorded. The precipitation was mostly rain and although some snow fell the ground was bare on the 30th.

The weather in New Brunswick, although dry and moderately fine, was rather cooler than usual, the mean temperature at most places being below average. On the 12th a heavy gale accompanied by snow occurred, after which the weather cleared and turned colder the country presenting a midwinter appearance. A few days later rains and afterwards sunshine quickly melted the snow near the coast; nevertheless there was much snow in the interior on the 30th. The minimum temperatures recorded were generally below 15°, and they occurred between the 11th and 18th. Navigation to Fredericton on the St. John River closed on the 13th.

In Nova Scotia the weather conditions varied with the district; altogether, however, they were about normal. At Port Hastings the mean temperature exceeded the average by 2·8°, and at Painsboro, the precipitation was

2.73 inches above average, but with these exceptions the departures were not great. Near Truro enough snow fell for sleighing and there was still snow on the ground on the 30th. At Sydney, Cape Breton, the first ice formed on the ponds on the 4th, but there was none on the 30th.

The weather in Prince Edward Island was much the same as in New Brunswick, nevertheless in some places it was cold and wintry. At Charlottetown sufficient snow for sleighing fell but by the end of the month it had disappeared. The minimum temperature in most districts was above 20, but in a few places it was below.—F. F. PAXE.

LOW AREAS.

Of twelve low areas traced during the month, the larger number were of feeble energy. Six first appeared over British Columbia and passed over Canada far to the northward. No. 1 was a continuance of No. 9 on the October chart. It passed across the Maritime Provinces on the 1st and 2nd, causing rain in the Maritime Provinces, snow in the St. Lawrence Valley, and strong breezes and gales from the Lakes to the Atlantic. No. 2 appeared over the South Atlantic States on the 2nd, and between the 3rd and 4th it caused heavy snow and rain in Ontario and Quebec, and in the Maritime Provinces rain, and at the same time the winds increased to gales over our Gulf and Ocean districts. No. 3 was a moderate depression which between the 6th and 9th passed from the British Columbia Coast far north over Canada to the Gulf of St. Lawrence attended by light rains, more especially from the Lake Region to our Atlantic Coast. No. 4 first appeared in the neighbourhood of Nebraska on the 9th; it passed a little to the southward of the Lower Lake Region and to Long Island, New York, as a moderate depression, but after reaching the Atlantic Coast it rapidly developed, and on the 12th swept across the Maritime Provinces as a severe storm attended by severe gales together with a heavy snowstorm in some localities and heavy rains in others. In Ontario and Quebec it caused light precipitation only and chiefly as snow. No. 5 was a shallow depression which appeared in the Western States on the 13th, and dispersed over the Ohio Valley on the 14th. It brought a fairly heavy rainfall to south-western Ontario. No. 6 appeared over British Columbia on the 13th, and travelled with much rapidity far north over Canada to the Lower St. Lawrence, thence southerly over the Maritime Provinces and off the Cape Breton Coast. It caused very little precipitation except in the Maritime Provinces where rain fell heavily during the night of the 15th, and the winds increased to fresh gales both in the Maritime Provinces and in the Gulf of St. Lawrence, and gradually shifted to the north-west and north. No. 7 also first appeared over British Columbia, but on the 15th, and it followed very much the same course as No. 6, but a little further to the southward, and after reaching the St. Lawrence Valley it passed south-eastward to Maine and thence over Nova Scotia. It gave showers pretty generally in Canada, but the rainfall was light except in the Lower St. Lawrence Valley and the Maritime Provinces. The winds also increased to the force of a moderate gale in many portions of the Lake Region. No. 8 was situated over British Columbia on the 18th, whence it moved far northward over the Dominion eventually travelling down over the St. Lawrence Valley on the 21st, and dispersed on the 22nd. It gave light precipitation generally from the Lakes to the Atlantic but scattered showers only elsewhere except in British Columbia. No. 9 was a moderate depression which was situated in Kansas on the 19th, and dispersed over the Middle States on the 23rd; it did not affect Canadian weather. No. 10 was situated in southeastern Texas on the 23rd. It afterwards moved along the north shore of the Gulf of Mexico and disappeared off the Hatteras Coast on the 27th. It likewise did not affect Canadian weather. No. 11 was a moderate depression, which like many of its predecessors during the month passed from British Columbia far north over Canada to the Lower St. Lawrence Valley, its accompanying showers being much more generally experienced in Quebec and the Maritime Provinces than elsewhere. No. 12 was a moderate depression which travelled over British Columbia to Lake Superior between the 27th and 29th, and then dispersed. It caused light local showers as far east as the Ottawa Valley.

HIGH AREAS.

There was not much high pressure during the month. The following description will give an idea of the prevailing conditions. No. 1 was centered in Manitoba on the morning of the 1st as an area of importance attended by cold weather; by the following morning it had two well defined centres, one situated over Lake Superior, the other in Dakota. The Lake Superior centre passed between the 2nd and 4th south-eastward and off the Cape Breton Coast attended by moderately cold weather from the Lakes to the Atlantic, whilst in the mean time the Dakota centre travelled southward to Texas, and then recurved to the north-eastward and reached the Atlantic Coast on the 8th. No. 2 was situated in the North Saskatchewan Valley on the 9th whence it travelled slowly over the Lake Superior and the Lower Lake Regions and passed off the Middle Atlantic Coast on the 14th. It was attended by sharp freezing weather in Canada, but no very low temperatures were recorded. No. 3 moved into Lake Superior on the 15th, from the northward, on the 16th, it passed over the Ottawa and St. Lawrence Valleys and thence southward and off the New England Coast. It was not marked by anything more than moderately cold weather. On the 23rd high pressure spread quickly over the

Continent from the Middle Pacific States and up to the 26th the distribution of pressure was largely anti-cyclonic. There was, however, no well defined movement and after the 26th the general distribution of pressure changed to cyclonic.

WINDS.

In British Columbia the direction of the wind during the month was very largely easterly and the force of a gale was reached on several occasions, more especially on the 19th, 20th and 25th. In the North-west Territories and Manitoba the southerly direction predominated, more especially in the Territories. The velocity seldom exceeded the force of a fresh breeze and that of a gale was only experienced on one or two occasions. In the Lake Region the direction was variable, no one direction being especially marked, the force of a moderate gale was reached locally on the 1st, 11th and 17th; there were no heavy gales and even strong breezes seldom occurred. In the St. Lawrence Valley the Gulf and the Maritime Provinces, the westerly direction was more general than any other, and in the Gulf and Maritime Provinces gales were experienced on the 4th, between the 12th and 13th, and between the 15th and 16th, the gale of the 12th and 13th being the most severe generally. Warnings were issued for the gales which were experienced from the lakes to the Atlantic except that of the 15th and 16th, in Eastern Canada, and this storm was seemingly only heavy locally. The signals were not hoisted at some stations in the Maritime Provinces before the storm of the 12th had begun, but the Friday night's forecast and the Saturday night's bulletin had both announced that a gale was indicated for Sunday, the 12th instant, in the Maritime Provinces. With regard to this latter storm it may be mentioned that at Port Hood seven fishing vessels went out on the morning of the 13th, in face of the warning and one of these vessels was swamped and another lost.

PRECIPITATION.

The rainfall over Vancouver Island and the Lower Mainland of British Columbia was excessive, and in that part of the Dominion it has been probably one of the wettest Novembers on record. Elsewhere throughout Canada precipitation was below average except in small sections of the North-west Territories and Manitoba, where it was very slightly above. The greatest amount below average was over the Lower Lake Region and the Georgian Bay district, Parry Sound, reporting 3.0 inches below, Southampton 2.7 inches below, Toronto 2.3 inches below, and Kingston 2.0 inches below. In the Province of Quebec the amount below average was about 1.5 inches, but in the Maritime Provinces the amount below average was generally quite small. A heavy fall of snow occurred over the Georgian Bay district on the 4th, and another one in the Maritime Provinces on the 12th, but the snow soon melted, and at the end of the month there was practically no snow on the ground in any portion of the Dominion.

TEMPERATURE.

The temperature was from average to 1 below in the Maritime Provinces, but elsewhere throughout Canada it was above average, and in nearly all localities to a large amount. This was strikingly the case in the Territories and Manitoba, where the average was exceeded by from 15 to 20. British Columbia and Ontario were also considerably in excess of the average.

The Highest and Lowest Temperature in each Province during November, 1899, were:

British Columbia,	76.0 on 13th at Quesnelle.	8.0 on 30th at Barkerville.
North-west Territories,	65.0 on 9th at Macleod.	9.0 on 30th at Kneehill.
Manitoba,	65.0 on 15th at Awenae.	8.0 on 2nd at Hillyview.
Ontario,	70.0 on 14th at Sprucedale.	—4.2 on 2nd at Uplands.
Quebec,	53.5 on 9th at Richmond.	—5.0 on 13th at Brome.
New Brunswick,	63.9 on 1st at Moncton.	2.6 on 15th at Sussex.
Nova Scotia,	65.0 on 1st at Yarmouth.	18.0 on 28th at Pictou.
Prince Edward Island,	61.5 on 2nd at Summerside.	14.3 on 28th at Charlottetown.

ATMOSPHERIC PRESSURE.

Atmospheric pressure was from average to 0.970 of an inch above in the Lake Region and the Ottawa and Upper St. Lawrence Valleys and below average in all the large remaining portion of the Dominion. The amount below average was very considerable from British Columbia to Manitoba and ranged from 0.10 of an inch in Manitoba to as much as from 0.23 to 0.26 in. in British Columbia and the Territories. Eastern Nova Scotia was as much as 0.10 in. below average and St. John's, Newfoundland, 0.23 in. below.

BRIGHT SUNSHINE.

Bright sunshine was below average to a small amount over Vancouver Island and the mainland of British Columbia and above average in all other parts of the Dominion, except at Winnipeg, where it also appears to have been slightly below the average. The greatest amounts above average were recorded at Battleford, Indian Head and Brandon and the largest amount below occurred at Agassiz.

[illegible]

Quarantine—(Continued)	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
Bequette	18	25	32	39	46	53	60	67	74	81	88	95	102	109	116	123	130	137	144	151	158	165	172	179	186	193	200	207	214	221	228	235	242	249	256	263	270	277	284	291	298	305	312	319	326	333	340	347	354	361	368	375	382	389	396	403	410	417	424	431	438	445	452	459	466	473	480	487	494	501	508	515	522	529	536	543	550	557	564	571	578	585	592	599	606	613	620	627	634	641	648	655	662	669	676	683	690	697	704	711	718	725	732	739	746	753	760	767	774	781	788	795	802	809	816	823	830	837	844	851	858	865	872	879	886	893	900	907	914	921	928	935	942	949	956	963	970	977	984	991	998	1005	1012	1019	1026	1033	1040	1047	1054	1061	1068	1075	1082	1089	1096	1103	1110	1117	1124	1131	1138	1145	1152	1159	1166	1173	1180	1187	1194	1201	1208	1215	1222	1229	1236	1243	1250	1257	1264	1271	1278	1285	1292	1299	1306	1313	1320	1327	1334	1341	1348	1355	1362	1369	1376	1383	1390	1397	1404	1411	1418	1425	1432	1439	1446	1453	1460	1467	1474	1481	1488	1495	1502	1509	1516	1523	1530	1537	1544	1551	1558	1565	1572	1579	1586	1593	1600	1607	1614	1621	1628	1635	1642	1649	1656	1663	1670	1677	1684	1691	1698	1705	1712	1719	1726	1733	1740	1747	1754	1761	1768	1775	1782	1789	1796	1803	1810	1817	1824	1831	1838	1845	1852	1859	1866	1873	1880	1887	1894	1901	1908	1915	1922	1929	1936	1943	1950	1957	1964	1971	1978	1985	1992	1999	2006	2013	2020	2027	2034	2041	2048	2055	2062	2069	2076	2083	2090	2097	2104	2111	2118	2125	2132	2139	2146	2153	2160	2167	2174	2181	2188	2195	2202	2209	2216	2223	2230	2237	2244	2251	2258	2265	2272	2279	2286	2293	2300	2307	2314	2321	2328	2335	2342	2349	2356	2363	2370	2377	2384	2391	2398	2405	2412	2419	2426	2433	2440	2447	2454	2461	2468	2475	2482	2489	2496	2503	2510	2517	2524	2531	2538	2545	2552	2559	2566	2573	2580	2587	2594	2601	2608	2615	2622	2629	2636	2643	2650	2657	2664	2671	2678	2685	2692	2699	2706	2713	2720	2727	2734	2741	2748	2755	2762	2769	2776	2783	2790	2797	2804	2811	2818	2825	2832	2839	2846	2853	2860	2867	2874	2881	2888	2895	2902	2909	2916	2923	2930	2937	2944	2951	2958	2965	2972	2979	2986	2993	3000	3007	3014	3021	3028	3035	3042	3049	3056	3063	3070	3077	3084	3091	3098	3105	3112	3119	3126	3133	3140	3147	3154	3161	3168	3175	3182	3189	3196	3203	3210	3217	3224	3231	3238	3245	3252	3259	3266	3273	3280	3287	3294	3301	3308	3315	3322	3329	3336	3343	3350	3357	3364	3371	3378	3385	3392	3399	3406	3413	3420	3427	3434	3441	3448	3455	3462	3469	3476	3483	3490	3497	3504	3511	3518	3525	3532	3539	3546	3553	3560	3567	3574	3581	3588	3595	3602	3609	3616	3623	3630	3637	3644	3651	3658	3665	3672	3679	3686	3693	3700	3707	3714	3721	3728	3735	3742	3749	3756	3763	3770	3777	3784	3791	3798	3805	3812	3819	3826	3833	3840	3847	3854	3861	3868	3875	3882	3889	3896	3903	3910	3917	3924	3931	3938	3945	3952	3959	3966	3973	3980	3987	3994	4001	4008	4015	4022	4029	4036	4043	4050	4057	4064	4071	4078	4085	4092	4099	4106	4113	4120	4127	4134	4141	4148	4155	4162	4169	4176	4183	4190	4197	4204	4211	4218	4225	4232	4239	4246	4253	4260	4267	4274	4281	4288	4295	4302	4309	4316	4323	4330	4337	4344	4351	4358	4365	4372	4379	4386	4393	4400	4407	4414	4421	4428	4435	4442	4449	4456	4463	4470	4477	4484	4491	4498	4505	4512	4519	4526	4533	4540	4547	4554	4561	4568	4575	4582	4589	4596	4603	4610	4617	4624	4631	4638	4645	4652	4659	4666	4673	4680	4687	4694	4701	4708	4715	4722	4729	4736	4743	4750	4757	4764	4771	4778	4785	4792	4799	4806	4813	4820	4827	4834	4841	4848	4855	4862	4869	4876	4883	4890	4897	4904	4911	4918	4925	4932	4939	4946	4953	4960	4967	4974	4981	4988	4995	5002	5009	5016	5023	5030	5037	5044	5051	5058	5065	5072	5079	5086	5093	5100	5107	5114	5121	5128	5135	5142	5149	5156	5163	5170	5177	5184	5191	5198	5205	5212	5219	5226	5233	5240	5247	5254	5261	5268	5275	5282	5289	5296	5303	5310	5317	5324	5331	5338	5345	5352	5359	5366	5373	5380	5387	5394	5401	5408	5415	5422	5429	5436	5443	5450	5457	5464	5471	5478	5485	5492	5499	5506	5513	5520	5527	5534	5541	5548	5555	5562	5569	5576	5583	5590	5597	5604	5611	5618	5625	5632	5639	5646	5653	5660	5667	5674	5681	5688	5695	5702	5709	5716	5723	5730	5737	5744	5751	5758	5765	5772	5779	5786	5793	5800	5807	5814	5821	5828	5835	5842	5849	5856	5863	5870	5877	5884	5891	5898	5905	5912	5919	5926	5933	5940	5947	5954	5961	5968	5975	5982	5989	5996	6003	6010	6017	6024	6031	6038	6045	6052	6059	6066	6073	6080	6087	6094	6101	6108	6115	6122	6129	6136	6143	6150	6157	6164	6171	6178	6185	6192	6199	6206	6213	6220	6227	6234	6241	6248	6255	6262	6269	6276	6283	6290	6297	6304	6311	6318	6325	6332	6339	6346	6353	6360	6367	6374	6381	6388	6395	6402	6409	6416	6423	6430	6437	6444	6451	6458	6465	6472	6479	6486	6493	6500	6507	6514	6521	6528	6535	6542	6549	6556	6563	6570	6577	6584	6591	6598	6605	6612	6619	6626	6633	6640	6647	6654	6661	6668	6675	6682	6689	6696	6703	6710	6717	6724	6731	6738	6745	6752	6759	6766	6773	6780	6787	6794	6801	6808	6815	6822	6829	6836	6843	6850	6857	6864	6871	6878	6885	6892	6899	6906	6913	6920	6927	6934	6941	6948	6955	6962	6969	6976	6983	6990	6997	7004	7011	7018	7025	7032	7039	7046	7053	7060	7067	7074	7081	7088	7095	7102	7109	7116	7123	7130	7137	7144	7151	7158	7165	7172	7179	7186	7193	7200	7207	7214	7221	7228	7235	7242	7249	7256	7263	7270	7277	7284	7291	7298	7305	7312	7319	7326	7333	7340	7347	7354	7361	7368	7375	7382	7389	7396	7403	7410	7417	7424	7431	7438	7445	7452	7459	7466	7473	7480	7487	7494	7501	7508	7515	7522	7529	7536	7543	7550	7557	7564	7571	7578	7585	7592	7599	7606	7613	7620	7627	7634	7641	7648	7655	7662	7669	7676	7683	7690	7697	7704	7711	7718	7725	7732	7739	7746	7753	7760	7767	7774	7781	7788	7795	7802	7809	7816	7823	7830	7837	7844	7851	7858	7865	7872	7879	7886	7893	7900	7907	7914	7921	7928	7935	7942	7949	7956	7963	7970	7977	7984	7991	7998	8005	8012	8019	8026	8033	8040	8047	8054	8061	8068	8075	8082	8089	8096	8103	8110	8117	8124	8131	8138	8145	8152	8159	8166	8173	8180	8187	8194	8201	8208	8215	8222	8229	8236	8243	8250	8257	8264	8271	8278	8285	8292	8299	8306	8313	8320	8327	8334	8341	8348	8355	8362	8369	8376	8383	8390	8397	8404	8411	8418	8425	8432	8439	8446	8453	8460	8467	8474	8481	8488	8495	8502	8509	8516	8523	8530	8537	8544	8551	8558	8565	8572	8579	8586	8593	8600	8607	8614	8621	8628	8635	8642	8649	8656	8663	8670	8677	8684	8691	8698	8705	8712	8719	8726	8733	8740	8747	8754	8761	8768	8775	8782	8789	8796	8803	8810	8817	8824	8831	8838	8845	8852	8859	8866	8873	8880	8887	8894	8901	8908	8915	8922	8929	8936	8943	8950	8957	8964	8971	8978	8985	8992	8999	9006	9013	9020	9027	9034	9041	9048	9055	9062	9069	9076	9083	9090	9097	9104	9111	9118	9125	9132	9139	9146	9153	9160	9167	

PRECIPITATION AT STATIONS REPORTING RAIN, SNOW, WEATHER, &c., DURING
NOVEMBER, 1899.

STATIONS	RAINFALL					SNOWFALL				Thunder and Lightning &c.
	Amount in inches.	Days of Over.	No. of Fair Days.	Heaviest Fall in Month.	Date.	Amount in inches.	No. of Days.	Heaviest Fall in Month.	Date.	
BRITISH COLUMBIA.										
Goldstream Lake	15.82	22	8	3.35	30					
Vancouver	15.07	25	7	1.78	29					
Royal Oak	9.33	24	6	1.24	29					
Langley	14.59	28	2	1.42	17					
Nanaimo	16.33	22	8	2.55	21					
Abertoe	23.47	26	4	2.67	23					
Chimberland	24.29	27	3	3.11	13					
N. W. TERRITORIES.										
Saltreots	0.05	1	27	0.05	28	3.0	2	3.0	9	
Beaver Hills (N.E.)	0.02	1	28	0.02	8	0.5	1	0.5	20	
Innisfail	0.06	1	27	0.06	16	2.7	2	2.7	9	
Conits	0.63	4	25	0.48	5	1.0	1	1.0	29	
Crescent Lake	0.16	1	27	0.16	28	2.1	2	2.0	9	
MANITOBA.										
Turtle Mountain	0.82	3	26	0.50	16	0.3	1	0.3	30	
Chen-spring	0.55	2	27	0.43	16	3.0	1	3.0	10	
Hartney	0.25	1	27	0.25	9	8.0	2	4.0	9 17	
Saskik	1.52	4	25	0.50	16	3.0	2	3.0	10	
Morden	0.50	1	24	0.50	16	2.0	2	2.0	10	
Cartwright	0.68	5	23	0.39	16	1.5	3	1.5	9	
Rapid City	0.80	1	25	0.80	16	2.0	3	2.0	10	
Pendora Crossing	0.79	2	19	0.79	16	2.0	4	2.0	9	
Oakbank	0.79	2	25	0.68	16	5.0	3	4.0	10	
Newspay	0.28	1	27	0.28	17	3.3	2	3.0	10	
Belmont	0.50	6	23	0.33	16		3		9	
Deloraine	1.15	3	26	1.10	16	1.0	2	1.0	9	
ONTARIO.										
N. Williamsburg	2.20	5	25	0.60	3	*	1		11	
Georgetown	0.74	8	18	0.25	3	2.0	2	1.8	11	
Georhoch	1.85	6	24	0.60	4					
Midford	0.86	7	21	0.30	4	1.5	2	1.0	10	
Orangeville	0.39	3	24	0.25	18	1.6	3	2.5	4	
Dutton	1.85	3	27	0.65	11					
Scarboro'	1.02	8	20	0.58	4		3			
Amoria	0.64	6	22	0.31	4	1.5	3	1.5	11	
Ennisdale	0.86	7	22	0.30	18	9.0	3	9.0	4	
Starrow Lake	0.27	2	26	0.21	23	2.2	2	1.7	5	
Wingham	1.60	5	25	0.60	11					
Valdridge	0.62	4	25	0.21	3	0.8	1	0.8	11	
Parma	2.13	6	24	0.60	11					
Hantsville	0.82	4	25	0.50	11	4.0	1	4.0	4	
Croydon	1.35	4	25	0.60	4		1		11	
Wooder	1.02	8	22	0.26	3		1		11	
Cherry Valley	0.63	2	28	0.39	3					
Lansdowne	1.37	5	24	0.55	1		1	*	11	
McFague	1.70	3	26	1.08	14	0.5	1	0.5	11	
Sunshine	1.29	9	21	0.59	4					Thunder on 18th.
Port Beavell	1.60	6	24	0.52	11					
Ardur	1.13	10	19	0.48	4	0.5	1	0.5	12	
Dalton	2.41	6	24	1.33	4					
Leon's Head	1.53	7	23	0.56	4					
Warton	1.10	2	27	0.60	18	2.0	1	2.0	4	Thunder on 19th.
Lynsloch	1.62	3	27	0.83	11					
Oliver's Ferry	1.15	6	24	0.45	1					
Uxas	1.04	9	21	0.21	4					
Princeton	1.21	5	25	0.50	4					
Watford	1.86	7	23	0.75	13					
Wilton Grove	1.30	7	23	0.53	15					
Robbins Mills	1.82	4	26	1.40	4					
Tobelo	1.37	5	24	0.62	3	2.5	1	2.5	11	
Deer Park	1.08	5	25	0.61	4					
Elton	1.53	5	25	0.61	4	1.0	1	1.0	11	
Emmerson	0.35	1	28	0.35	10		1		11	
Providence Bay	1.24	5	25	0.53	17					
Kirk's	1.16	2	25	0.59	22	1.0	1	1.0	11	
NEW BRUNSWICK.										
Pont-Es-umme	2.72	6	22	1.53	2	0.3	3	0.2	23	
NOVA SCOTIA.										
Port Morden	0.83	11	19	0.94	13					
P. I. ISLANDS.										
Murray River	3.46	13	17	0.94	7					

Aurora recorded —

Where the class of a *aurora* is noted by the observer, it is given, (I) being the brightest, (IV) the feeblest in brilliancy.

1. Savanne.
2. Savanne : Cunningham Manor, IV.
3. St. Anne, IV : Chicoutimi : Aweme, III : Red Deer, II : Savanne : W. Beaver Hills, II : Father Point, IV : Barnardo, IV : Tagish, IV.
4. Gravenhurst, IV : Aweme, III : Muskowpetung : Prince Albert, I : Minnedosa, IV : Battleford, III : Barnardo, IV.
5. Savanne, Barnardo, IV.
6. Savanne, Minnedosa, Father Point, IV.
7. Savanne.
8. Cunningham Manor, IV.
13. Swift Current, IV.
21. Moose Jaw : Tagish, IV.
22. Gravenhurst, IV : Red Deer, III : W. Beaver Hills, IV : St. Agathe.
23. Gravenhurst, IV : Chicoutimi : Muskowpetung, I : Duck Lake, III : Rat Portage, Father Point, III : Barnardo, II.
24. West Beaver Hills, IV.
25. Chicoutimi, Aweme, III : Emsdale, IV : W. Beaver Hills, III : Pembina Crossing, III : Prince Albert, I : Swift Current, IV : Barnardo, IV : Cunningham Manor, IV.
27. Pembina Crossing, IV : Prince Albert, II.
28. West Beaver Hills, IV : Shoal Lake.
29. Swift Current, IV : Father Point, III.
30. Red Deer, III : Minnedosa, IV : Father Point, III : Barnardo, III.

Thunder reported on—

5. Bermuda.
12. Yarmouth.
18. Sunshine.
19. Warton.
20. Lakeland.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE THE HORIZON IN THE MONTH OF NOVEMBER, 1899.

	Hours Ending															
	5 a.m.	6 a.m.	7 a.m.	8 a.m.	9 a.m.	10 a.m.	11 a.m.	Noon.	1 p.m.	2 p.m.	3 p.m.	4 p.m.	5 p.m.	6 p.m.	7 p.m.	8 p.m.
Victoria				0.00	0.08	0.26	0.16	0.16	0.21	0.19	0.15	0.08	0.02	0.00		
Kuper Island				0.00	0.03	0.15	0.17	0.16	0.20	0.24	0.21	0.08	0.02	0.00		
Agassiz				0.00	0.02	0.10	0.11	0.16	0.16	0.14	0.06	0.04	0.04	0.00		
Battleford				0.13	0.38	0.52	0.58	0.60	0.49	0.45	0.40	0.42	0.00	0.00		
Indian Head				0.00	0.05	0.24	0.48	0.58	0.56	0.60	0.56	0.45	0.04	0.00		
Brandon				0.04	0.20	0.31	0.51	0.48	0.58	0.60	0.52	0.43	0.04	0.00		
Winnipeg				0.04	0.23	0.26	0.32	0.33	0.35	0.35	0.36	0.35	0.05	0.00		
Durham				0.00	0.03	0.12	0.20	0.21	0.20	0.22	0.18	0.19	0.11	0.00		
Woodstock				0.02	0.26	0.49	0.26	0.32	0.37	0.31	0.38	0.32	0.13	0.00		
Toronto				0.08	0.30	0.34	0.33	0.29	0.38	0.35	0.40	0.25	0.10	0.00		
Lindsay				0.08	0.19	0.26	0.30	0.34	0.28	0.30	0.28	0.26	0.10	0.00		
Barrie				0.02	0.14	0.27	0.33	0.34	0.31	0.32	0.20	0.09	0.00	0.00		
Kingston				0.14	0.32	0.51	0.39	0.32	0.35	0.28	0.29	0.28	0.09	0.00		
Ottawa				0.07	0.26	0.35	0.32	0.34	0.33	0.31	0.29	0.26	0.08	0.00		
Montreal				0.07	0.20	0.27	0.29	0.34	0.36	0.32	0.35	0.14	0.00	0.00		
Fredericton				0.06	0.22	0.32	0.36	0.40	0.41	0.45	0.43	0.37	0.14	0.00	0.00	
	Victoria	Kuper Island	Agassiz	Battleford	Indian Head	Brandon	Winnipeg	Durham	Woodstock	Toronto	Lindsay	Barrie	Kingston	Ottawa	Montreal	Fredericton
Mean proportion for month (Constant sunshine being 1.)	0.13	0.14	0.09	0.41	0.36	0.41	0.29	0.15	0.26	0.29	0.25	0.21	0.28	0.27	0.29	0.33
Difference from average	-.06	-.05	-.09	+.13	-.13	+.13	-.06		-.01	-.01	-.01	-.03	+.02	-.01	-.00	-.00
Maximum daily amount	0.65	0.63	0.77	0.85	0.76	0.90	0.92	0.75	0.94	0.90	0.94	0.63	0.96	0.91	0.99	0.91
Date	4	11	2	15	5	25	4	7	12	12	12	23	12	3	2	17
No. of days completely clouded	12	15	21	10	9	9	14	15	4	5	10	9	10	13	10	10

OBSERVATIONS AT NORWAY HOUSE, N.W.T., 1899.

Latitude N. 53° 58'. Longitude W. 97° 52'. Height, 730 feet.

	MEAN PRESSURE AT 32.			TEMPERATURE.					PRECIPITATION.		
	8 a.m.	6-28 p.m.	Mean.	8 a.m.	6-28 p.m.	Mean.	Mean Min.	Mean Daily Range.	Monthly Mean.	Total Amount.	Depth of Snow.
	in.	in.	in.							in.	in.
September.	29.17	29.15	29.160	46.4	49.1	56.3	40.1	16.2	48.2	2.74	
October.	29.10	29.12	29.110	35.5	37.1	42.6	31.3	11.3	36.9	1.06	8.5
November.	29.09	29.08	29.085	26.6	28.0	33.7	21.9	11.8	27.8	0.70	6.2

NOTE.—March to August of this table was published in the October review.

	DIRECTION OF WINDS FROM								FORCE OF WINDS.		AMOUNT OF CLOUDS.		Nos. of Days.		Thunder Storms.	Aurora.
	N.	N.E.	E.	E.S.	S.	S.W.	W.	N.W.	Calms.	8 a.m.	6-28 p.m.	8 a.m.	6-28 p.m.			
March	8	12	0	0	7	5	5	3	22	1	1	43	35	0	0	7
April	6	14	2	4	8	6	6	4	10	11	1	30	59	0	0	2
May	6	16	5	3	11	7	4	3	7	11	11	49	42	1	1	1
June	4	17	8	7	2	10	1	2	9	11	11	38	46	0	1	0
July	8	19	6	0	6	9	12	2	9	11	11	36	41	0	8	1
August	8	3	4	1	14	10	4	6	7	11	11	56	59	0	1	12
September	9	5	7	5	14	7	4	5	7	111	11	49	53	1	2	4
October	10	10	0	8	3	10	10	4	7	111	11	79	72	0	0	3
November	8	11	6	9	13	14	3	1	5	11	11	72	80	3	0	2

FORECASTS FOR NOVEMBER, 1899.

The forecasts issued by this office at 11 p.m. each night, are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 930. These were divided as follows:—

DISTRICT.	No. Issued.	VERIFIED.			
		No. Fully.	No. Partly.	No. Not.	Percentage.
Manitoba	93	76	11	6	87.6
Lake Superior	110	75	20	6	81.4
Lower Lake Region	113	91	14	8	86.7
Georgian Bay	113	90	14	9	85.8
Ottawa Valley	90	74	4	12	84.4
Upper St. Lawrence	90	73	4	13	83.3
Lower St. Lawrence	94	73	18	5	85.4
Gulf	113	93	15	5	88.9
Maritime Provinces	112	93	15	4	89.7
Total	930	738	124	68	86.0

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by two and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent the predictions have been verified, the reports from the agents at all observing stations, as well as the telegraphic reports, are used.

The storm warnings and forecasts for November were issued by Forecast Official B. C. Webber.

R. F. STUPART,
Director.

Meteorological Office, Toronto,
23rd December, 1899.

METEOROLOGICAL SERVICE, DOMINION OF CANADA.

Monthly Weather Review.

VOL. XXIII

DECEMBER, 1899.

No. 12

INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather forecasting, and reports by mail from voluntary observers and storm signal agents. For the material used in tracing the paths of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

REMARKS UPON THE WEATHER.

The weather of December, though departing in the aggregate little from the normal, excepting in the temperature, which was above the average, showed many local departures. The snowfall in most districts was light and excepting in portions of Ontario, Quebec and the Maritime Province, there was little upon the ground on the last day of the month. In many districts rivers and lakes were frozen over unusually late. Several heavy gales were reported, these occurring more especially in Ontario and the Maritime Provinces and causing some loss of life.

In British Columbia the weather was exceptionally mild, the temperature being above average; and although there was much cloud and the falls of rain or snow were unusually frequent, the precipitation altogether was about average. The maximum temperatures occurred at most places between the 22nd and 25th, and were about 54°; and the minimum about the 17th, 27° at French Creek to -24° at Parkerville being recorded. On the 31st there was no snow upon the ground, and on Vancouver Island wild roses were in bloom in the early part of the month.

The weather in the North-west Territories was almost normal, and although there were some local departures they were generally unimportant. At Medicine Hat the temperature was 3.6° above average, and at Chaplin it was 3.0° above, these being the chief exceptions. The maximum temperatures, which were generally between 40° and 55°, occurred at most stations about the 22nd, and the minimum temperatures, which were generally between -12° at Chaplin and -37° at Edmonton, were recorded generally on the 16th and 17th. Little snow fell until the last week, and on the 31st the ground was only lightly covered. Chinook winds occurred rather frequently, and the accompanying high temperatures soon melted the snow. In most districts there was much cloud.

In Manitoba the weather was for the most part fine, mild and dry, the temperature being above average, the precipitation below, and the amount of cloud unusually small. At Stony Mountain the temperature was 6.4° above the average, and at Winnipeg it was 5.6° above. The maximum temperatures, which were generally between 40° and 50°, occurred about the 22nd at most places, and the minimum temperatures, ranging between -17.0° at Portage la Prairie and -24.7° at Brandon, about the 30th. During the first three weeks the precipitation was mostly rain, after which some snow fell, but there was little on the ground on the 31st. Most rivers were frozen over early in the month.

In most districts in Ontario the temperature and precipitation were above average, but there were local exceptions, and at several stations in the south-western portion these conditions were reversed. The greatest departures in the temperature and precipitation above average occurred in eastern and northern Ontario. The maximum temperatures, which at most stations were between 50° and 56°, were recorded generally about the 11th and 12th, and the minimum, which varied between 2.0° above at Pelee Island and -12.5° at White River, north of Lake Superior, occurred on or about the 29th. Although snow fell upon several occasions during the month in southern districts, the ground was bare at most places on the 31st, but in northern and eastern Ontario there was good sleighing by that date. A heavy gale passed over Lake Erie on the 1st, causing loss of life, and another equally severe passed over the province on the 10th. At several places in the southern portion some garden and wild flowers were still in bloom early in the month.

In the province of Quebec the weather was exceptionally mild, the temperature being as much as 7.1° above average at Chicoutimi, and the precipitation, which was mostly snow, was also above average in most districts. The highest temperatures, which were generally between 50° and 60°, occurred about the 12th, and the lowest, which ranged between -4.5° and -19.0°, were recorded generally about the 31st.

The weather in New Brunswick, though unusually mild was exceptionally dull, and the precipitation, like the temperature, was at most places above average. The highest temperatures, which occurred generally about the 12th, were at most places between 50 and 55, but at Dalhousie the maximum was 65.0. The minimum temperatures, which ranged between 9.0 at Point Lepreau and 27 at Sussex, were reported from most stations on the 31st. At St. John gales occurred on the 2nd, 4th, 8th, 12th and 15th, the wind reaching a velocity upon each occasion of 42 miles per hour. There was not much sleighing until the last week of the month.

In Nova Scotia the temperature was above average, whilst the precipitation varied, it being well above average at Sydney, Port Hastings and Whitehead, and below elsewhere. The maximum temperatures were at most stations between 50 and 55, the dates of occurrence varying. The minimum temperatures, which ranged between -4 at Parrsboro' and 19 at Whitehead, were recorded generally on the last few days of the month. Several severe gales occurred during the month. At Halifax dandelions were in bloom on the 3rd.

In Prince Edward Island the weather was for the most part fine and mild, the temperature being above average and the precipitation average or below. The maximum temperatures were about the same as in New Brunswick, but the minimum temperatures, which occurred generally on the 31st, were higher. The ground was bare of snow during the greater part of the month, and navigation was open up to the 31st.—F. F. PAYNE.

ATMOSPHERIC PRESSURE.

The mean atmospheric pressure was a tenth of an inch below average in Cape Breton, and thence westward the departure diminished until at Quebec it was just average. Westward from this across the Lake Region to Eastern Manitoba the departure from average was minus, with a difference of 0.07 of an inch in the Ottawa Valley and over the Upper Lakes. From Manitoba to the Pacific the average was generally exceeded, with the greatest departure (0.15 of an inch) over Saskatchewan.

HIGH AREAS.

Eleven high areas have been charted, most of which were extensive, covering large portions of the continent. Three of these showed a tendency to hover, two of them over the Middle Pacific States and one over the North-west. Two first appeared in the North-west Territories and passed south and east across the continent: one came from the extreme North-west States and dispersed over the Middle Atlantic States, after having nearly crossed the continent; two came from the north of Lake Superior and passed south-eastward to the Atlantic. The paths of the remainder were short, and two of the areas were absorbed by others. The most important area of the month was present during the last few days, and brought decidedly cold weather from the Rocky Mountains to the Gulf of St. Lawrence.

LOW AREAS.

Eleven low areas have been traced: four came from the North-west Territories or British Columbia, taking generally an easterly or southeasterly course, one came from the middle Mississippi Valley moving northeastward, one from Texas taking a north-east course, and one appearing near the New England Coast passed northward across the Gulf of St. Lawrence.

The mean rate of movement of the low areas was about thirty-five miles per hour.

No. 1 was centred over Missouri on the 30th November, over the lakes on the morning of the 1st, and thence travelled to Newfoundland, which it reached on the 3rd. It was generally attended by high winds and caused a fresh gale on the Bay of Fundy. No. 2 was centred over eastern Pennsylvania on the night of the 3rd. It developed quickly, took a north-easterly course and gave a fresh gale throughout the Eastern Provinces on the 1th and then moved to Labrador. No. 3 moved as a comparatively shallow area from Manitoba to the Lake Region: it then increased in energy giving high winds and heavy local snowfalls throughout its subsequent course from Ontario to the more southern part of the Maritime Provinces. No. 4 passed across the North-west Territories and thence eastward as an ill-defined area until approaching the seaboard when a marked development occurred and a gale prevailed in the Maritime Provinces. No. 5 appeared off the British Columbia coast on the 8th; it moved to the North-west Territories, then to the north of Lake Superior where it dispersed. It was rather unimportant. No. 6 appeared over Texas on the 10th and moved north-eastward with quickly increasing energy and a strong gale with heavy rainfall prevailed in the Lake Region between the 11th and 12th; the storm moved towards James Bay and thence eastward with diminishing energy to Newfoundland. No. 7 seems to have formed over Kentucky and Tennessee on the morning of the 14th. It moved quickly northeastward with increasing energy, crossing Newfoundland on the 16th. It gave high winds and a general fall of snow from the Lakes to the Atlantic, excepting in the Maritime Provinces, where the precipitation was partly rain. No. 8 was of small dimensions and gave strong winds and a fall of rain from the Lakes to the Atlantic. No. 9 after hovering over the northern portions of the North-west Territories was centred over Keewatin on the 23rd. It then moved south-east to the Upper Lakes and then north-eastward

apparently dispersing over Northern Quebec. It caused a fresh gale throughout Manitoba and the Lake Region. No. 10 was centred over Alabama on the 23rd and then moved quickly northeastward, dispersing next day over New England States. No. 11 was first clearly defined as centred off the New England Coast on the night of the 29th. It crossed the Maritime Provinces there giving high winds, then passing to the north of the Gulf of St. Lawrence.

WINDS.

In British Columbia the winds most in evidence were from between E. and S., and no gale was recorded. In the North-west the most prevalent winds were westerly generally moderate to fresh, but two moderate gales occurred. This prevalent westerly direction was also well in evidence from the Lakes to the Atlantic. One fresh gale occurred in Manitoba, one moderate and one fresh in the Lake Superior district, five occurred on the Lower Lakes, those of the 12th and 24th reaching the force of a strong gale. Eight moderate to fresh gales were experienced in the St. Lawrence Valley and in the Maritime Provinces. The display of storm signals was discontinued to Lake Stations after the 10th instant. The storms which occurred on the Lakes on the 3rd and 9th, were warned, but the gale of the 7th was not warned. In Eastern Canada six gales were duly warned, but the storms that were experienced on the 2nd and 8th, were not warned.

TEMPERATURE.

Temperature was above average throughout the Dominion, except in a few small sections, where it was just about the average, or slightly below. These sections were a portion of Alberta, the extreme southern part of Assiniboia, the extreme south-western part of Ontario, and in the neighbourhood of White River, in the Lake Superior District. From the Georgian Bay region to our Atlantic Coast the average was considerably exceeded.

The Highest and Lowest Temperature in each Province during December, 1896, were :

British Columbia,	58.5 on 3rd at Port Simpson.	— 24.0 on 16th at Barkerville.
North-west Territories,	56.0 on 22nd at Calgary.	— 37.0 on 16th at Edmonton.
Manitoba,	47.0 on 21st at Portage la Prairie.	— 24.7 on 30th at Brandon.
Ontario,	65.0 on 21st at Port Hope.	— 42.5 on 29th at White River.
Quebec,	60.0 on 12th at Brome.	— 19.0 on 31st at Brome.
New Brunswick,	65.0 on 24th at Dalhousie.	27.0 on 31st at Sussex.
Nova Scotia,	55.8 on 12th at Truro.	4.2 on 31st at Parrsboro'.
Prince Edward Island.	57.0 on 13th at Summerside.	5.2 on 31st at Summerside.

PRECIPITATION.

The precipitation was below average over British Columbia, Manitoba and the southern portions of the North-west Territories, below average over the Peninsula of Ontario, and in parts of Nova Scotia and Prince Edward Island, and elsewhere above the average. During the first three weeks of the month the precipitation was very largely rain, but during the last week it was in Ontario, Quebec and the Maritime Provinces nearly altogether snow. In British Columbia there was no snow on the ground at the end of the month; the North-west Territories and Manitoba had only a light covering, or in some localities none. In Ontario it varied from a trace at south-western stations to from 10 to 20 inches in northern localities. In Quebec it varied from 2 to 10 inches, and in the Maritime Provinces from 2 to 13 inches.

BRIGHT SUNSHINE.

Bright sunshine was slightly below average at Victoria and on the Mainland, but at Kuper Island it was slightly above. It was slightly below average in the North-west Territories and slightly above in Manitoba. In Ontario the amount recorded varied from just about average to slightly above average. In Quebec, below average to the amount of 11 and in New Brunswick 7 below average.

[illegible]

PRECIPITATION AT STATIONS REPORTING RAIN, SNOW, WEATHER, &c., DURING
DECEMBER, 1899.

STATIONS	RAINFALL				Date.	SNOWFALL				REMARKS.
	Amount in inches.	Days of or Over.	No. of Fair Days.	Heaviest Fall in Month.		Amount in inches.	No. of Days.	Heaviest Fall in Month.	Date.	
BRITISH COLUMBIA.										
	in.			in.		in.		in.		
Royal Oak	9.64	15	14	1.50	20	5.0	2	3.0	15	
Goldstream Lake	9.64	18	10	1.54	21	6.5	3	5.0	15	
Alberni	12.93	15	15	2.56	6	3.0	3	4.5	16	
Lantzley	19.52	18	12	1.75	21	2.5	1	2.5	16	
Nanaimo	6.56	11	19	1.67	20	3.0	1	3.0	15	
Vancouver	11.15	21	9	1.19	21	2.0	3	2.0	16	
N. W. TERRITORIES.										
N. E. Beaver Hills						8.0	7	2.5	12	
W. Beaver Hills						10.3	14	3.3	12	
Crescent Lake						2.5	3	1.4	2	
Imperial	R					5.0	5	2.5	15	
Salvcoat						1.5	2	1.0	2	
Coots						14.7	6	5.0	12	
MANITOBA.										
Deloraine	0.05	9	23	0.03	21	5.3	6	2.0	1	
Rapid City						0.2	1	0.2	2	
Hartney						5.0	2	3.0	2	
Norquay						3.3	4	1.5	17	
Pembina Crossing							6			
Belmont							1			
Sheol Lake							3			
Morden						3.0	4	3.0	16	
Oxbow	R					3.0	4	1.0	1	
Turtle Mountain	R					4.5	3	2.5	1	
ONTARIO.										
Gothench	0.70	2	23	0.46	2	11.5	6	6.0	30	
Midland	1.94	6	18	1.10	11	36.5	8	15.0	24	
Georgetown	1.94	10	10	0.96	11	9.5	15	2.5	15	
Wingham	1.20	2	26	0.30	11	13.0	4	9.0	4	
Arden	3.32	10	19	1.08	12	12.0	3	5.0	15	
Barrie	5.86	8	18	1.03	12	40.0	6	18.0	6	
Amora	1.61	6	20	1.25	13	9.6	6	5.3	14	
Lions' Head	1.89	1		1.28	11					
Huntsville	3.18	5	18	1.00	12	18.0	9	5.0	25	
Dealboun	1.94	9	20	0.75	11	1.8	5	1.5	14	
Watford	2.07	2		1.60	11					
Orangeville	2.16	1	18	1.03	11	10.4	9	3.3	14	
Elmhurst	1.35	3	22	1.05	11	8.7	6	5.0	14	
Port Burwell	2.29	1	21	0.80	11	9.0	3	1.0	4	
Knoblo	2.19	5	17	1.64	12	28.8	12	8.5	24	
Crofton	2.40	5	21	1.50	12	17.0	1	6.0	24	
Cherry Valley	3.53	7	21	1.41	11	35.0	3	15.0	25	
Wooler	3.64	8	19	1.65	12	19.0	5	10.0	31	
Jermy	2.84	6	24	1.20	11	10.0	4	6.0	14	
Laundowne	2.19	6	17	0.80	24	27.5	8	15.0	7	
Sparton Lake	1.09	3	18	0.85	11	25.4	10	6.5	24	
Dutton	2.47	1	23	1.15	11	5.0	4	2.0	14	
Ober's Ferry	1.75	1	25	1.00	11	8.0	3	4.0	15	
Leira	3.13	6	19	1.60	11	17.0	6	1.0	14	
Lynscho	3.29	8	20	1.75	11	8.2	3	3.2	30	
Deer Park	2.30	6	20	0.77	11	3.2	6	3.0	14	
Elzen	3.61	7	21	1.50	11	11.0	3	7.0	15	
Emmerson	2.35	4	25	1.00	11	8.0	2	4.0	12 25	
Providence Bay	2.76	7	16	1.62	12	17.0	8	6.0	28	Thunder on 1st.
Princeton	2.45	6	19	1.10	11	8.5	7	4.0	14	
Smith's Falls	3.83	6	22	1.31	11	9.0	3	5.0	15	
McIntyre	2.05	5	22	1.35	11	6.0	4	3.0	24	
Robbins Mills	3.66	5	21	1.72	11	30.5	5	14.0	5	
Simsline	2.14	3	12	1.44	11	29.5	16	1.0	6	
Warton	1.67	2	20	1.20	11	31.0	10	15.0	30	
Scarbora	1.68	8	19	0.72	11	4.0	7	4.0	15	
Wilton Grove	2.57	1	17	1.78	11	9.0	9	4.0	24	
NEW BRUNSWICK.										
Port Richmond	0.79	6	23	0.46	25	1.0	3	0.4	15	
NOVA SCOTIA.										
Port Morden	4.13	13	13	0.94	3	7.0	6	3.0	28	
P. E. ISLAND.										
Murray River	2.39	8		0.80	18	Frequent light snow				

Aurora recorded—

Where the class of aurora is noted by the observer, it is given, (I) being the brightest, IV, the faintest or
brilliancy

2. Gravenhurst, IV.
3. West Beaver Hills, Red Deer, IV.
4. West Beaver Hills
5. West Beaver Hills, IV; Savanne.
6. Pembina Crossing, IV; West Beaver Hills, Red Deer, IV.
7. Barnardo, IV; Pembina Crossing, III; Aweme, IV.
8. Minnedosa, IV; Pembina Crossing, III; Treherne, IV.
9. Minnedosa, IV; Pembina Crossing, IV; Aweme, III.
10. Truro, IV.
11. Hillview, III.
20. Chicoutimi.
21. Huntsville, IV; Chicoutimi
25. Savanne.
26. Pembina Crossing, III; Aweme, III; Duck Lake, IV; Cockburn Island, Savanne, St. Agathe.
27. Barnardo, III; Prince Albert, II; Hillview, IV; Pembina Crossing, III; Aweme, IV; Duck Lake, III; Savanne, Oonikup, Channel Island, II.
28. Barnardo, IV; Truro, IV; Battleford, IV; Minnedosa, IV; Duck Lake, III; Savanne, Tanguish.
29. Barnardo, IV; Battleford, IV; Minnedosa, IV; Pembina Crossing, IV; Treherne, III; Duck Lake, IV; West Beaver Hills, IV; Savanne, Oonikup, Channel Island, IV.
30. Minnedosa, IV; Pembina Crossing, IV; West Beaver Hills.
31. Battleford, IV.

TABLE CXXXV.—SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE THE HORIZON IN THE MONTH OF DECEMBER, 1899.

	HOURS ENDING AT—															
	5 a.m.	6 a.m.	7 a.m.	8 a.m.	9 a.m.	10 a.m.	11 a.m.	Noon	1 p.m.	2 p.m.	3 p.m.	4 p.m.	5 p.m.	6 p.m.	7 p.m.	8 p.m.
Victoria					0.00	0.02	0.12	0.12	0.26	0.37	0.15	0.18	0.05	0.00		
Kent Island					0.00	0.08	0.03	0.18	0.23	0.35	0.24	0.23	0.08	0.00		
Alexis					0.00	0.03	0.05	0.14	0.16	0.37	0.20	0.11	0.02	0.00		
Barleford					0.01	0.16	0.23	0.29	0.33	0.36	0.26	0.08	0.00	0.00		
Indian Head					0.00	0.00	0.03	0.22	0.32	0.33	0.40	0.36	0.05	0.00		
Brandon					0.00	0.26	0.43	0.55	0.57	0.58	0.51	0.45	0.19	0.00		
Winnipeg					0.00	0.13	0.30	0.60	0.51	0.40	0.53	0.55	0.29	0.00		
Dulhota					0.02	0.06	0.16	0.15	0.19	0.30	0.19	0.21	0.22	0.12		
Woodstock					8	0.00	0.09	0.22	0.35	0.34	0.33	0.27	0.21	0.04		
Toronto					0.01	0.26	0.53	0.53	0.55	0.52	0.44	0.36	0.24	0.05		
Lindsay					8	0.11	0.30	0.33	0.29	0.15	0.27	0.11	0.07	0.03		
Barnes					8	0.00	0.23	0.23	0.17	0.24	0.26	0.03	0.07	0.00		
Kingston					0.02	0.13	0.15	0.36	0.29	0.31	0.24	0.25	0.17	0.01		
Ottawa					0.00	0.07	0.11	0.42	0.50	0.37	0.34	0.25	0.11	0.00		
Montreal					0.00	0.02	0.19	0.27	0.16	0.34	0.24	0.17	0.02	0.00		
Fredericton					0.00	0.16	0.30	0.23	0.33	0.37	0.42	0.38	0.01	0.00		
Mean for month					0.13	0.16	0.16	0.23	0.23	0.40	0.44	0.37	0.33	0.25	0.21	0.29
Days on which sun shined					0.02	0.13	0.04	0.07	0.01	0.09	0.07	0.03	0.00	0.01	0.00	0.11
Mean for daily amount					0.68	0.69	0.61	0.84	0.73	0.89	0.91	1.00	0.85	0.92	0.82	0.86
Days on which sun shined					3	3	3	5	6	27	24	21	21	28	29	30
No. of days completely					13	12	24	10	12	5	7	21	13	9	13	11

MONTHLY and Annual Summaries for the Year 1899, Fort Simpson, Mackenzie River—Latitude, N. 61° 42'
Longitude, W. 121° 43'. Height above Sea, 600 feet.

MONTH	TEMPERATURE						RAIN.		SNOW.			Depth of snow at end of month	Thunder Storms.		
	Mean Max.	Mean Min.	Mean Daily Range	Max.	Min.	Monthly Range	Monthly Mean	Ant. Days	Ant. Days	Cut in.	Fees				
								in.		in.					
January.	7.3	-29.4	22.1	10.0	-54.0	64.0	18.3	0.00	0	9.8	9	1	1	27.5	0
February	12.8	-37.2	24.4	7.0	-54.0	61.0	25.9	0.00	0	5.5	4	11	0	28.0	0
March	3.4	-18.8	22.2	26.0	-37.5	63.5	7.7	0.00	0	4.7	9	14	0	29.0	0
April	34.8	-11.4	23.4	56.0	-11.0	67.0	23.1	11	3	15.1	5	6	0	24.0	0
May	46.0	-25.4	20.6	66.0	-9.0	75.0	35.7	1.12	8	5.3	5	2	0		1
June	65.6	-43.2	22.4	76.0	-36.5	39.5	54.4	3.84	20				0		0
July	70.5	-55.0	33.5	84.0	-35.0	49.0	60.0	4.99	8				0		0
August	65.9	-41.6	24.0	77.0	-24.0	53.0	53.6	6.87	5				0		0
September.	54.2	-32.8	21.4	64.0	-23.5	40.5	43.5	1.34	6				7	0	0
October	28.6	-12.6	16.0	58.0	-7.5	65.5	20.6	0.14	1	5.5	4	9	2	2.0	
November	14.0	-4.1	9.9	36.0	-22.0	58.0	9.9	0.00	0	15.7	8	10	4		0
December															
Year															

January 4th, blizzard; February 19th and 20th, blizzard; March 21st and 22nd, calm; 31st, auroræ, geese and ducks; 12th, white water; 13th, swans; 17th, Liard River broken up; 24th, still a light snow on ground; September 30th, violent wind storm from N. W. continued; 16th, ice drifting briskly from Liard; 21st, ice drifting from Mackenzie; 28th, Liard closed; 29th, Liard broken out again; N. W. 1st, 17th, Liard blocked by ice; 26th, Mackenzie very strong.

MONTHLY and Annual Summaries for the Year 1899, Stuart's Lake, British Columbia—Latitude, N. 54° 28';
Longitude, W. 124° 12'. Height above Sea, 1,800 feet.

MONTH	TEMPERATURE						RAIN.		SNOW.			Depth of snow at end of month	Thunder Storms.	
	Mean Max.	Mean Min.	Mean Daily Range	Max.	Min.	Monthly Range	Monthly Mean.	Ant.	Days	Ant.	Days			Cut.	Fees
								in.		in.				
January.	25.4	-11.8	13.6	42.9	-47.0	89.9	18.6	2.33	5	16.0	4	0	0	
February	33.1	-3.4	20.7	45.0	-31.0	76.0	48.2	0.48	1		1	1	0	3.6
March	27.7	-9.2	18.5	54.5	-35.0	89.5	18.4	0.00	0	10.0	3	0	0	3.0
April	45.4	-20.9	24.5	58.0	-11.0	69.0	33.1	0.03	2	0.0	0	0	0	2.0
May	53.0	-25.5	27.5	64.0	-11.0	75.0	39.3	0.70	6	1.0	1	0	0	
June	65.1	-33.5	31.6	83.0	-28.5	54.5	49.3	1.14	3				0	0
July	77.8	-36.7	44.1	93.0	-29.5	63.5	57.3	1.06	6				0	0
August	67.8	-33.5	34.3	85.0	-19.9	65.4	50.6	1.03	3				0	0
September.	54.8	-31.1	23.7	67.0	-18.9	48.1	43.0	0.95	4				0	0
October	37.4	-21.7	15.7	62.0	-1.0	61.0	29.5	1.00	4	6.0	3	0	1	
November	37.0	-20.8	16.2	45.0	-11.0	34.0	28.9	0.15	1	2.0	2	0	4	0.2
December	18.7	-5.7	13.0	39.9	-31.2	71.1	12.2	0.22	2	15.0	6	1	0	11.0
Year	45.3	-21.2	24.1	93.0	-47.0	140.0		5.56	35	50.0	20	2	5	

January 21st and 22nd, heavy rain and very warm; February 13th, rain; April 16th, good lightning; July 25th, potatoes touched by frost; August 26th, hard frost; 31st, ice formed; October 1st, first snow; 19th, hard frost; December 22nd, rain.

CLIMATE OF OBSERVATIONS AT CALMANAH, VANCOUVER ISLAND, JANUARY TO OCTOBER, 1899.
 LATITUDE N. 48 37 LONGITUDE W. 124 47. HEIGHT ABOVE SEA, 130 FEET.

Month.	PRECIPITATION, INCHES.								TEMPERATURE.					
	Sum. 8 p.m.	8 p.m.	Mean.	Sum. 3 p.m.	3 p.m.	Mean.	Mean Max.	Mean Min.	Mean Daily Range.	Max.	Min.			
	in.	in.	in.	in.	in.	in.								
January	29.80	29.79	29.78	29.79	18.8	41.8	46.2	39.0	42.4	35.7	6.7	50.0	19.0	
February	29.89	29.87	29.84	29.87	36.5	38.9	37	36.4	40.8	31.8	9.0	48.0	12.0	
March	29.76	29.81	29.78	29.78	40.3	44.7	40	40.4	45.4	35.5	9.9	52.0	31.0	
April	29.84	29.87	29.82	29.83	45.6	48.9	45.6	45.1	50.4	40.1	10.0	61.0	34.0	
May	29.85	29.86	29.84	29.85	48.5	49.2	46.8	47.9	51.6	44.3	7.3	61.0	36.0	
June	29.92	29.94	29.94	29.93	52.3	55.1	50.4	51.4	55.2	47.6	7.6	63.0	45.0	
July	29.89	29.88	29.87	29.88	57.1	61.0	55	56.4	63.2	49.6	13.6	80.0	44.0	
August	29.78	29.78	29.77	29.78	57.8	61.3	55.6	54.9	60.6	49.2	11.4	64.0	42.0	
September	29.91	29.89	29.88	29.89	55.1	59.6	54.1	55.2	61.0	49.3	11.7	68.0	45.0	
October	29.79	29.78	29.77	29.78	48.3	51.1	48.2	48.6	52.2	45.0	7.2	60.0	39.0	

Mo. Year.	NO. OF WINDS FROM										Mean Force.	RAIN.		SNOW.		Clouded Sky.	No. of Fogs.
	N.	N.E.	E.	E.S.	S.	S.W.	W.	N.W.	Calm.	Am't.		Days.	Am't.	Days.			
in.																	
January	6	7	38	8	3	6	17	0	8	111	16.86	23	2.0	4	75	2	
February	2	5	40	3	13	0	18	0	3	14	16.11	17	6.0	5	82	0	
March	10	6	21	0	1	12	30	0	11	111	6.87	16	1.7	5	65	0	
April	5	1	22	10	3	9	33	0	7	14	9.76	18			56	0	
May	1	0	13	15	3	11	29	1	17	11	8.69	17			57	1	
June	0	0	8	3	2	6	48	1	22	11	1.55	8			57	5	
July	1	0	13	3	4	0	38	1	33	1	0.51	8			54	18	
August	1	0	21	0	1	1	18	0	51	1	0.91	10			58	11	
September	1	0	35	2	1	1	19	1	30	11	3.40	7			49	9	
October	4	0	41	20	3	0	9	2	14	111	9.12	17			51	2	

FORECASTS FOR DECEMBER, 1899.

The forecasts issued by this office at 11 p.m. each night, are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 985. These were divided as follows :—

DISTRICT.	No. Issued.	VERIFIED.			
		No. Fully	No. Partly	No. Not	Percentage
Manitoba	98	73	14	11	81.6
Lake Superior	114	89	25	9	81.1
Lower Lake Region.....	120	84	22	14	79.2
Georgian Bay.....	115	80	20	15	78.3
Ottawa Valley	104	73	19	12	79.3
Upper St. Lawrence.....	104	67	28	9	77.9
Lower St. Lawrence.....	103	71	21	11	79.1
Gulf.....	109	79	18	12	80.3
Maritime Provinces	118	62	38	18	68.6
Total	985	609	205	111	78.3

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by two and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent the predictions have been verified, the reports from the agents at all observing stations, as well as the telegraphic reports, are used.

The forecasts and storm warnings for December were issued by Forecast Official H. V. Payne.

R. F. STUPART,
Director.

Meteorological Office, Toronto,
26th January, 1900.





P

Astron.
Can.

Canada. Meteorological Service

Author

Monthly weather review. 1899

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